LEVEL ONE

ANCIENT EGYPT AND THE EAST

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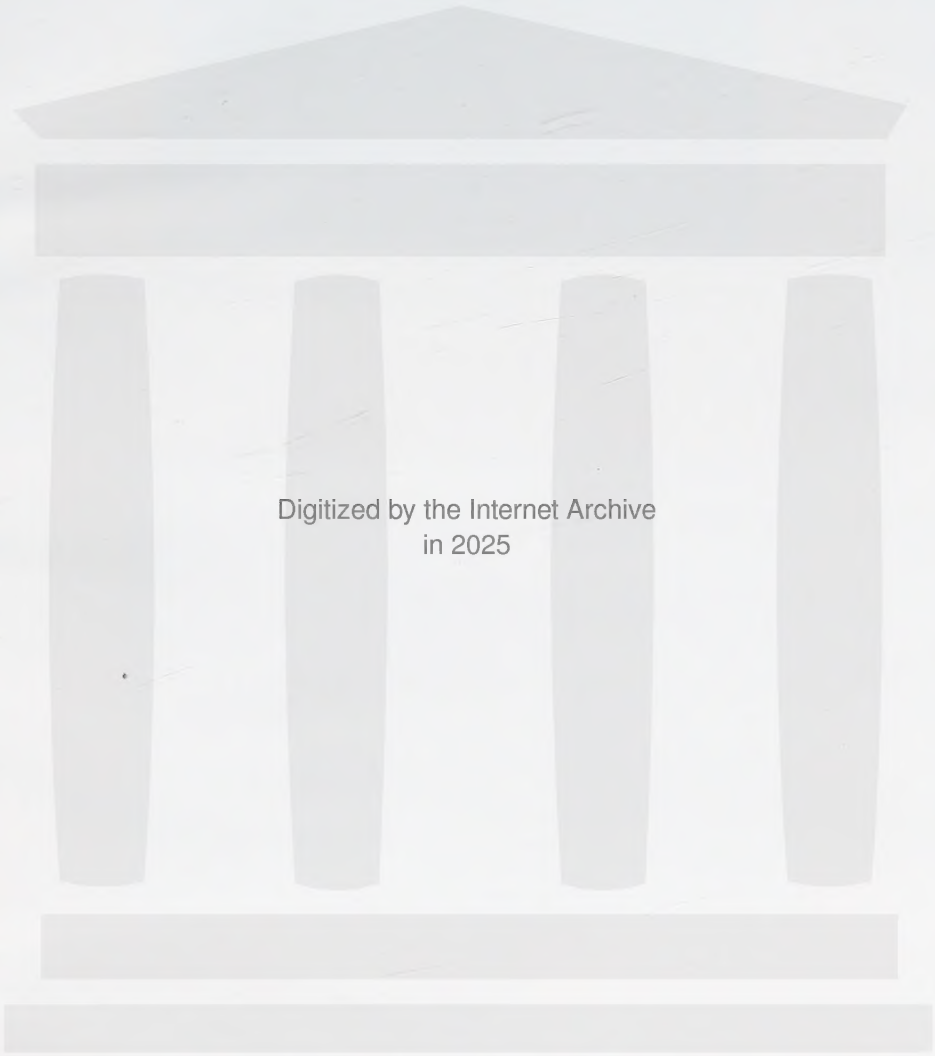
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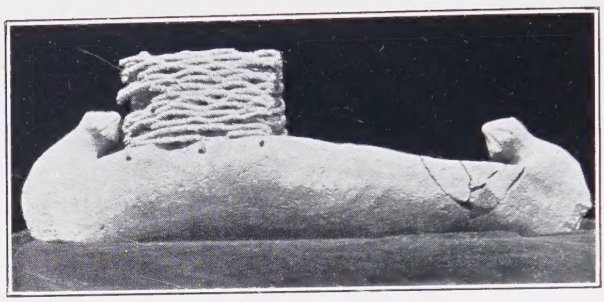


Predynastic Pottery Model of Papyrus Boat, with Figure of the Deceased seated under an Awning: University College, London.

(*Egyptian Shipping*, p. 12, fig. 45.)

ANCIENT EGYPT AND THE EAST

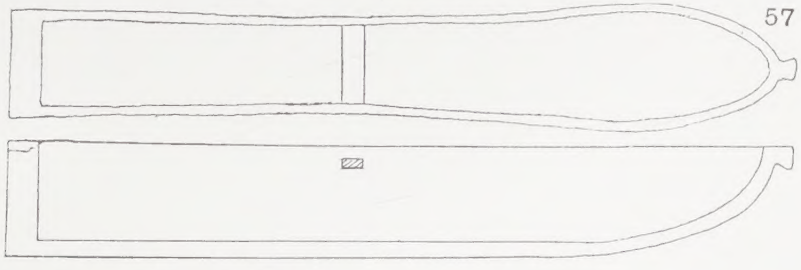
EGYPTIAN SHIPPING.

(Continued.)

Wooden Ship Construction.

The simplest shape among wooden boats is the dug-out (57). It is carefully formed, well smoothed outside, and regular in thickness. The model is 18 inches long. A single thwart is let in to the sides, without going through. Nothing like it is known in painting, nor any other models. Yet it is certainly ancient, it had been stained red, it is broken near the stern by some heavy weight, and parts of the thick stern are missing. It was bought in Upper Egypt, and there seems no reason to question its source there. The only examples of dug-out trunks that I have seen are two solid block coffins of the Vth dynasty (*Deshasheh,* 18). The form of this model differs essentially from any other boats in the square stern and the knob on the prow.

The construction of a wooden boat on the lines of the papyrus type is figured at Meydum (58). The use of mallet and chisel and a heavy adze proves that the body is of wood. The binding as of papyrus bundles round the ends may be a concession to old ideas, like the stone facing to iron structures to-day. The tying group in the middle may be securing a papyrus covering for the deck.



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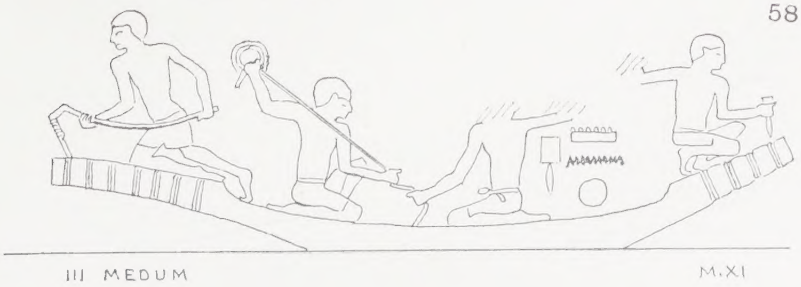
U.C. DUG-OUT

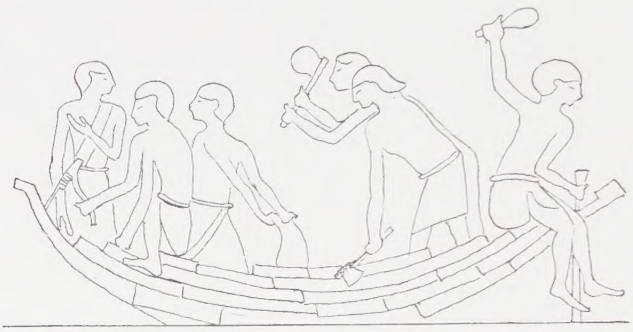


58

III MEDUM M.XI

The scene of building a boat of short lengths of *sont* wood is well known (59). The Denkmäler version represents the logs as all crooked; the Egypt Exploration Fund Survey's version shows them straight. The former drawings have been so largely improved on by the lithographer that the latter version seems the safer authority, though it is rougher. The action here is by mallet and chisel at one end, by adze at the other, and by axes for trimming in the middle. Tying also appears, so that it seems that ties were used to clip the strakes together, probably through mortices, as in the Ist dynasty houses (*Tarkhan* I, ix, x). The mode of building, by dowel and mortice in the edges of the logs, we have already described. The scene of bracing a boat (60) before floating it off the stocks we have noted already (p. 3). For Nile boats it was only a temporary precaution, but the brace was permanent for ocean vessels in order to resist the strain over waves.

59



XII BENIHASAN LD II,126 B.I-XXIX

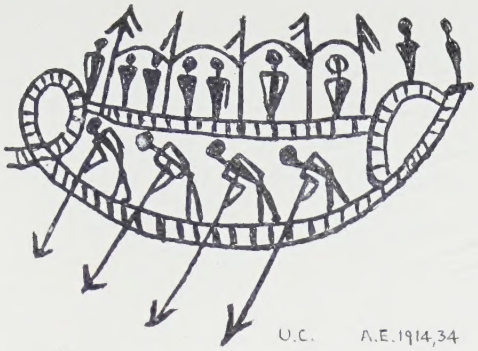
60

ZOWYET EL MYETYN L.D.II 108

Fittings.

The fitting up of vessels was already developed in the Gerzean age, when a pleasure ship with cabins for women (61) was employed. It was gently poled along by a few men. The same leisurely progress when out for an airing is seen in the XIIth dynasty (62), where the rowers all sit on high stools, from which no serious pull could have been exerted. This was due to the whole deck being boarded over, so that there was space for legs below. The women are in a long cabin, gay with checkered matting outside, and with a roof ventilated all along the side.

Another favourite roofing in the VIth dynasty and onward was a curved shell of matting on a framework over the steerage, on the top of which the steersman usually sat (63, 71, 72). In front of this other cabins were added. In 63 a large square cabin was framed by papyrus bundles bound regularly,



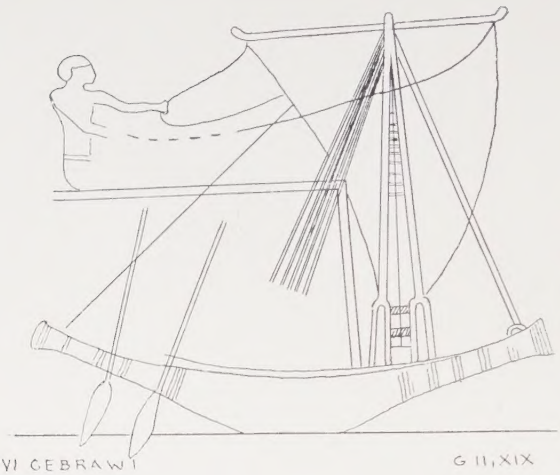
from which strips of matting hung down. They were securely fastened, as a permanent window was placed in the side. This cabin did not occupy the whole beam of the boat, but a gangway was left along the side in order to reach stores below the deck, which are being handed out. Large boats of this kind usually had a low railing around the bows, as on the ocean vessels also (78, 80). The cabin was strong enough to have light goods stowed on the top of it, and the gangway at the side was wide enough for cattle.

Sails.

The sail was always hung from a horizontal yard (64, 65). To take in sail this upper yard was lowered (72); or in fighting ships the sail had no spreader yard, but was loose-footed and trussed by half-a-dozen brails at intervals raising it to the yard (82, 83).

While usually there was a spreader-yard below, as in 65, a trigon sail appears rarely (64). It is well adapted to Nile use as the height of the banks leaves little value to the lower part of a sail—most of the breeze is high up. By reducing the sail to a trigon space was saved below for movement and cargo. The forked form of the straddle masts in 64 is remarkable; it may have been intended to

64



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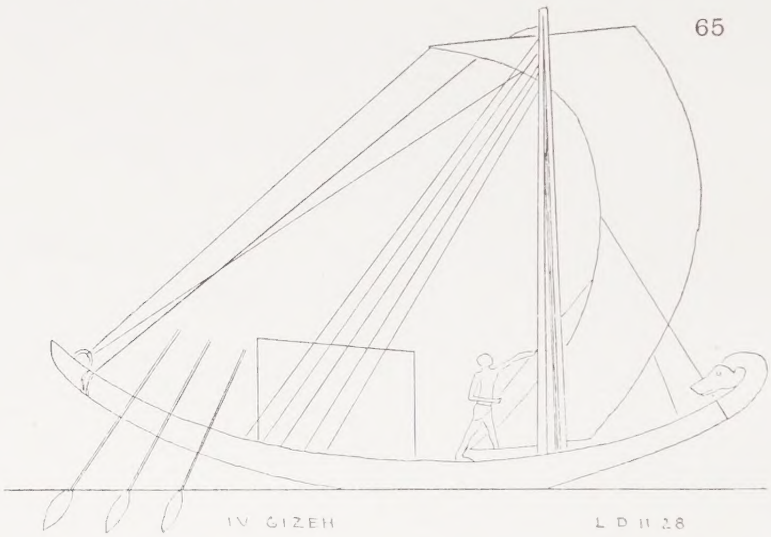
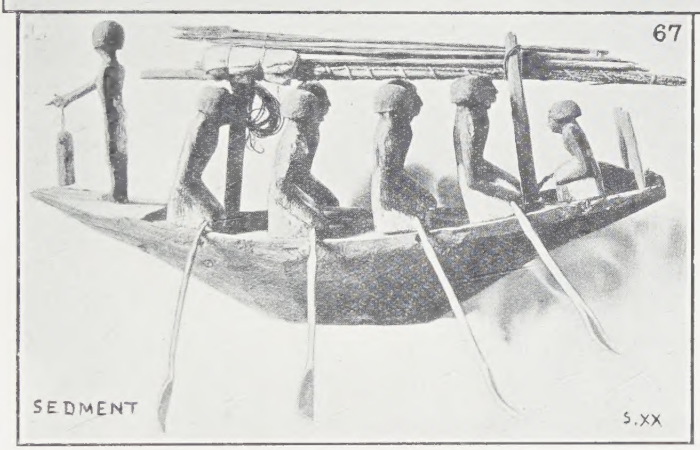


spread the pressure on the side. The straddle had a line passing down between the legs (64, 65); this seems to be attached to weights at the foot of the sail, and may be for furling by drawing the foot up the mast. The upper part of the straddle is bridged across with steps, which aided in climbing. In 64 the fore stay is doubled, reeved through a bee near the bow. A back stay is but slight, the five halyards forming the main support of the mast against the wind pressure. The cabin is partly destroyed; on the top is a man holding the vangs for trimming the sail. How the double vang in the left hand was worked is not clear; it looks as if one end was at the main-top, if so it may have served as a bunt-line to hold in the bellying. Of course the cabin and man are far too large and high up in relation to the yard; the view 65 is nearer to the true proportion.

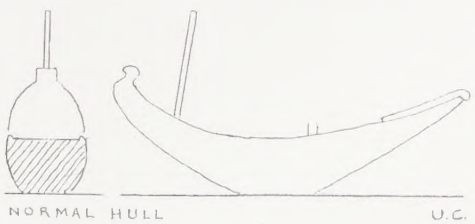
What the action in 65 means is not explained elsewhere; it appears as if a bunt-line held the sail from bellying too far to one side, with a further control by a bowline held on deck: the great length of the narrow sail would make it hard to handle without lateral control. The back stay ran down to loop on to the stern; while the vangs were worked from the stern as a continuous rope through a bee.

The actual models in 66 and 67 are useful, as they give the true positions

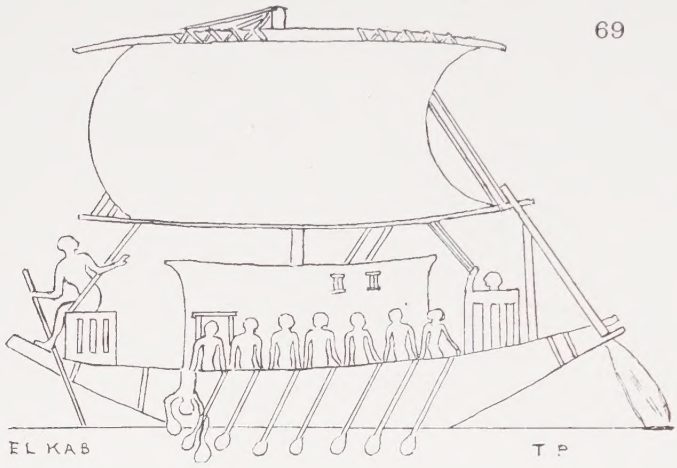


of the men, having been found in controlled excavations (*Sedment* I, xx) ; other exact models (*Gizeh* and *Rifeh,* xc) are at Manchester. At the bows a man holds the fender. For going up the Nile the sail is raised ; for going down, the mast and yards are stowed on posts and the sail done up in a bundle, while the sailors have the oars out to row down. In the Rifeh models the look-out and the steersman sit muffled up as the boat is going against the north wind, while they stand in slight dress when going up stream with the wind.

In these funeral models the hull is poorly modelled ; an example at University College (68) shows the flat base (to avoid grounding), the mid-ship section shaded, and the stern outline.



By the beginning of the XVIIIth dynasty Nile boats had more detail. In the time of Tahutmes I, Paheri figures the boat 69 with a large cabin that occupies the main part of the deck having door and windows. Fore and aft are the covers of the gangways to the hold (compare those in 80). The sail is lashed on to the yard. The action of the rigging seems incomplete, as if the artist did not know the working.



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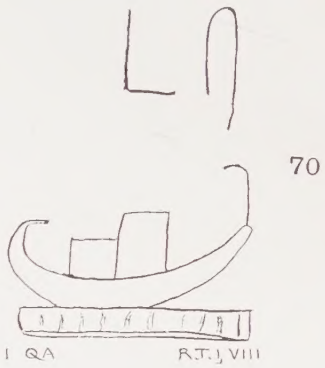

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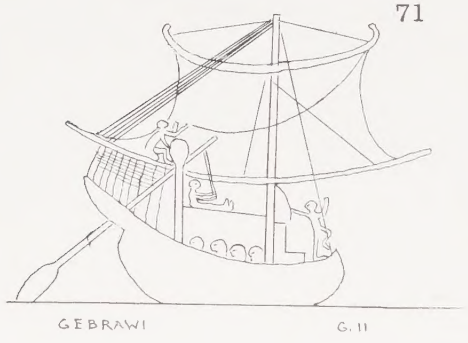


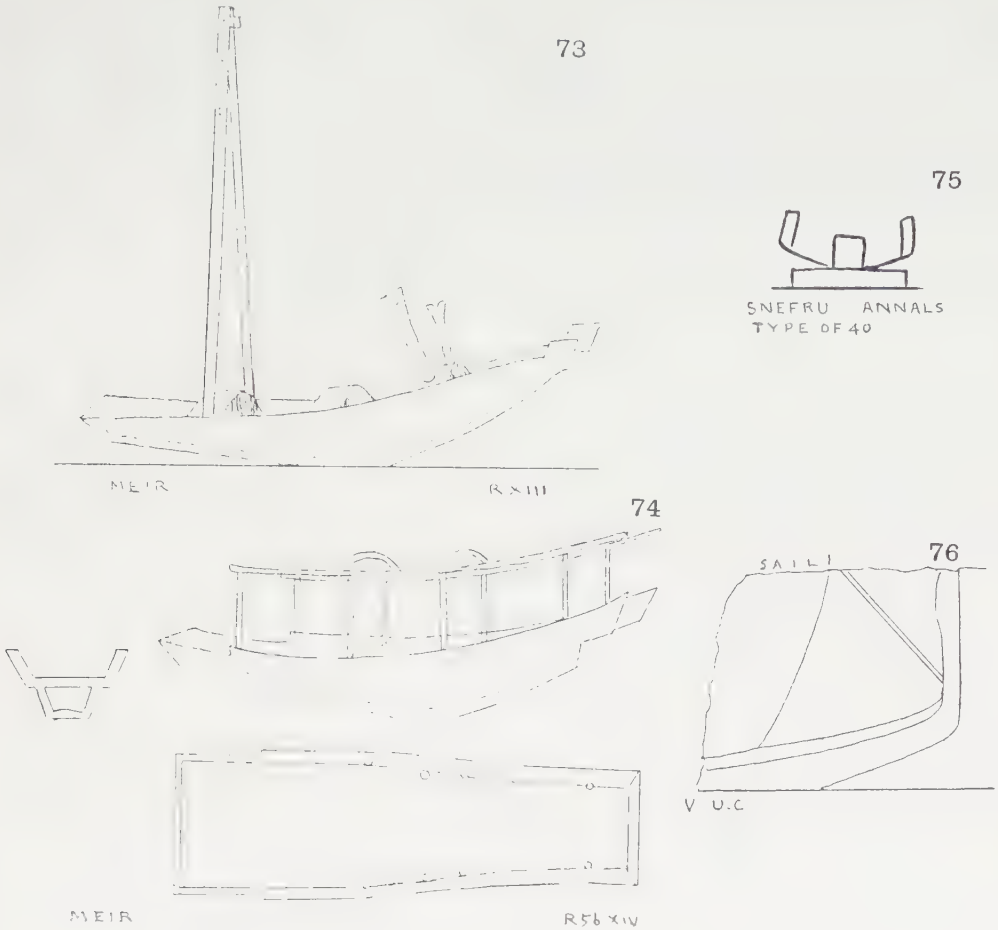
71

72

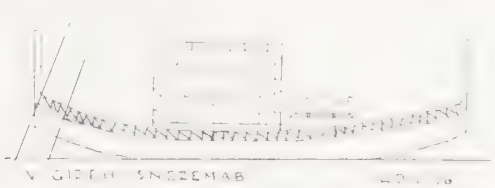
We turn now to abnormal types with high poop and great overhang. The first suggestion of this is in an outline of dynasty I (70). At Deir el Gebrawi the tombs of the VIth dynasty were designed by an artist who loved ships, and plenty of accurate detail is provided. In 71, 72 there is a fence round the stern, apparently of matting, forming a cabin on the top of which the sailor is trimming the sail (71), holding the vang. On a lower cabin sits the steersman happily holding the tiller. There are apparently women in the cabin. At the bows the look-out is holding a rope, perhaps a signal to the steersman. The yard is deeply curved, and the spread-yard is hung by lifts. The great projection of the poop is the punt type (74), perhaps for fishing. The mast in 71, 72 is lashed to a massive knee timber. In 72 the lifts of the yard and spread-yard are seen, also one vang. The yard is partly lowered and the spread-yard raised. The halyards in both vessels run to the extreme stern. The action of the man poling in getting a kick off the mast is true to life, but it implies a very narrow beam.

The punt type was evidently for quiet fishing (73, 74). It had a straddle mast, the holes for which are seen in the plan of 74. The awning frame implies

a leisurely time in hot weather. The shallow forepart would easily slip ashore, and the raised stern, open below, would suit fishing.



The upright prow and stern post were early introduced (75); the forty vessels brought in by Seneferu, presumably from Syria (see 81), were of this type. Though usual on sea-going ships later, such a prow and stern occur on a Nile boat (76), and on the funeral barge of Senezemab (77). The sea-going ships of Seneferu were developed by the time of Sahure (78) for Syrian expeditions to Byblos. The straddle mast is here so heavy that it is not set on posts when taken down, but is let down into a bay between the steering posts over a loop of rope which could be pulled to help in raising the mast. The great rope brace which binds the vessel has a tightening spar in it, which has been twisted to contract the brace, and tied to the quoin post in the middle. The lashing pattern around the boat beneath the rail is not explained. In 77 it



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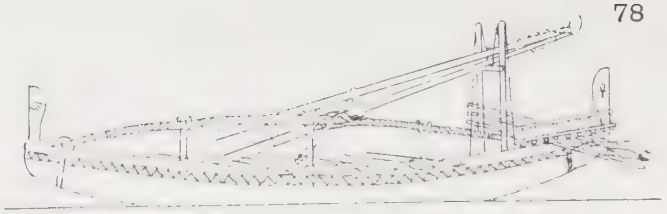
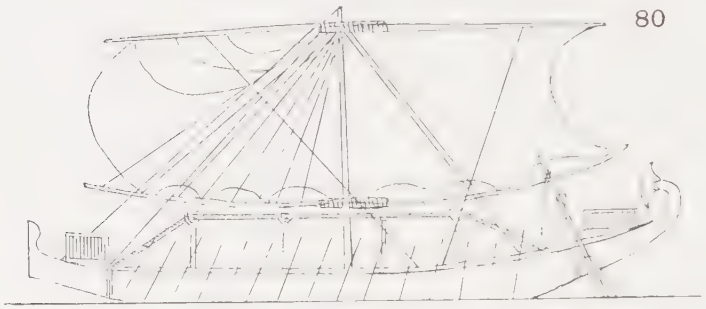


V SAHURA S.II, XIII

79

DEIR EL BAHRI, GUARD N.D.B. CLIII

80



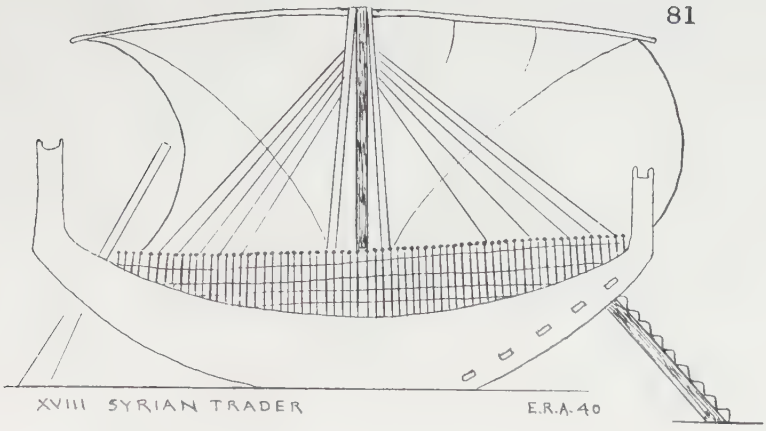
XVIII DEIR EL BAHRI CARGO SHIP N.D.B LXXIII

might be the edge of a deck cover held to the gunwale ; but in 78 the deck could not be covered, for the well to hold the rowers' legs would prevent it.

Deir-el-Bahri temple gives many examples of the large type of Nile boat. The guard boat 79 attended a set of ten tugs, of the same form except that both ends were cut square. On this guard boat were the official quarters in two storeys. The lower had framed doorways with lintels, and on the roof of the upper floor were three *mulqafs*, or ventilators. These boats depended entirely on rowing, and the stumpy mast was only for towing ropes. The tugs were all linked together in a chain, the front of one to the steering posts of the next in front, the posts to the mast, the mast to the fore part. Thus there was no strain on each mast except that of the pull caused by its own boat. The mast merely kept the ropes up to prevent entanglement.

The great cargo ship 80 traded down the Red Sea to the Somali coast of Punt, the name of which remains in the islet Ha-Fun at about 10° 20′ north. The strain of heavy cargo and waves needed permanent bracing, supported on four posts, so as to make a lifting pull at the ends. The hull was lashed round to consolidate it where the pull came. The great yard was made of two pine trunks lapped at the thick ends and firmly lashed together. The stay for the mast was a doubled stay both fore and aft. There were seven lifts on each side for the spreading-yard, but those on the right are here omitted for clearness. The nature of three curved lines from the peak to points along the yard is difficult to interpret. The sails were trimmed by vangs coming to a point rather abaft the mast. The two gratings round the descents to the hold are at the ends.

81

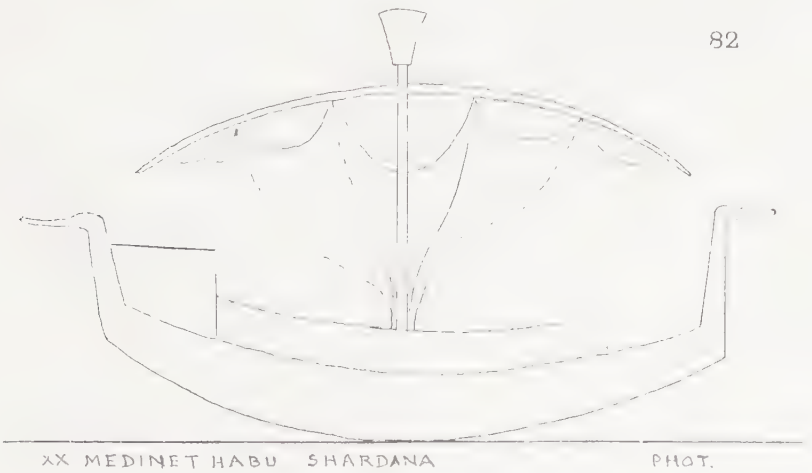


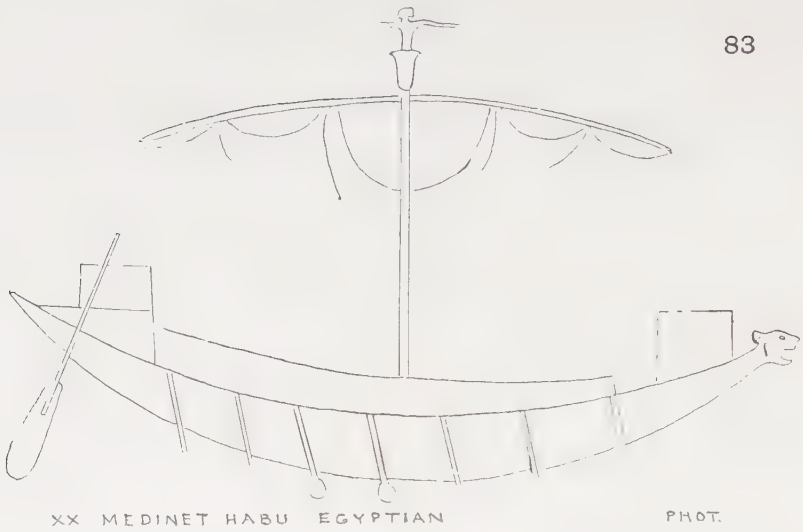
The Syrian ship of the XVIIIth dynasty (81) is of great interest as showing what construction was general, or was peculiar to Egypt. The copy here is enlarged from a small photograph. There is a stout central mast, stayed by a straddle mast, a form which had disappeared long before in Egypt. An abundance of stays or halyards are placed both fore and aft. Two vangs come down from the yard to the deck near the masts. Both prow and stern rise straight up, with a notch at the top. All along the side there is a screen of matting to break the wind and spray. A plank ladder with steps is put out for going ashore. The ends of beams shown all down the bow suggest that there was a considerable width there, and that the form was very bluff in front.

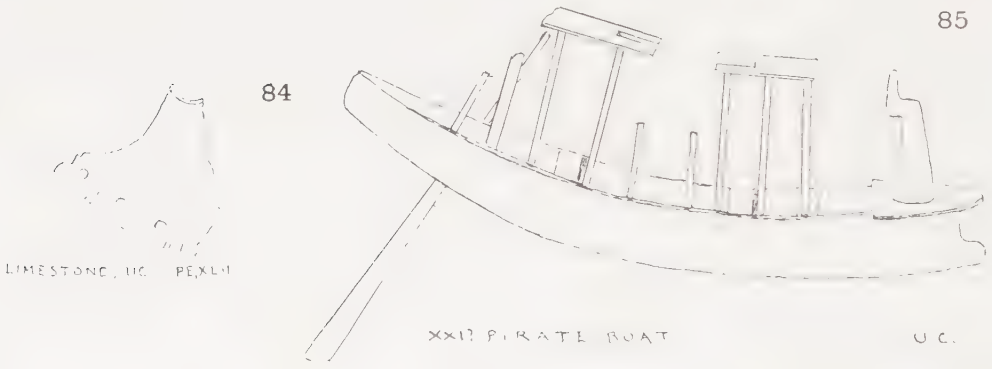
The Mediterranean war ships (82) are figured on the north wall of Medinet Habu temple, in the great naval battle of the overthrow of the Peoples of the Sea, mainly Philistines and Shardana, 1187 B.C. The upright prow and stern posts are like those in the trading ship: but they end in birds' heads. There were long cabins on the ships, and a raised steering platform. The sails were furled by brails, descending to the foot of the mast, thus raising the sail out of the way for fighting. On the mast was a crow's nest for slingers, like the sharp-shooters in our old navy.

The contemporary Egyptian vessel (83) has kept much more the old papyrus lines; in fact it may well have been made of papyrus like the ships in Isaiah.

82







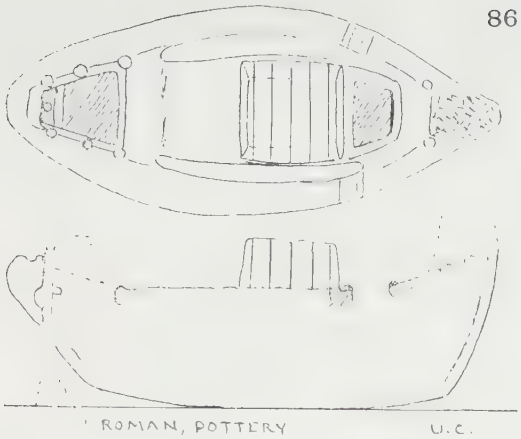
The ends slope up and the prow bears a lion's head. The rest of the vessel is of the foreign type, probably borrowed from the foreigner when fighting on the Mediterranean became usual.

Fig. 85 is another vessel of much the same date, a little pirate boat, designed for rapid attack and boarding. There are four thwarts, seating eight rowers. A light wood roof shades part, and would suffice to bear a cloth thrown over it. In the bows is a platform for landing, and below it a deadly little ram. The action would be for the pirates to lie to by some island, and when a small trading vessel passed them row out swiftly, ram it so that the crew would be occupied in saving the vessel; the pirates would then swarm up, catch the top of the stern post to swing on to the boarding platform and so on to the trading vessel. Seizing what they could secure by force, they could return quickly and be off while the trader was saving himself from sinking. The model was mounted on wheels as a child's toy, and was found broken up in a late tomb, probably dating from *c.* 1,000 B.C.

Fig. 84 shows a strange piece of alabaster, of prehistoric age, which seems inexplicable, unless it be a model of a ram from a vessel.

A barge of Roman date (86), modelled in pottery, serves to show the deck arrangements. There are two entrances, the fore hatch for entering the cabin, the after hatch for stowing cargo. In the after hold a cross-bar held in place the rudder post, which passed through a hole in the stern. The cabin rose high

86



enough to give a clear view around, and on each side of the deck there were combings to stop wash across the deck; outside the combing the top slopes rapidly outward. There are also slight combings around the hatches. The ornament on the prow is broken away.

FLINDERS PETRIE.

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THE BISMAR IN ANCIENT INDIA.

The existence of the bismar on the Malabar coast [1] makes it highly probable that this method of weighing has existed in India for many centuries. The trading relations between Sumer and the Indus valley [2] introduced to Mesopotamia several elements of the Indus culture and, likewise, were bound to influence the latter's civilisation. As the bismar was known and used in Sumer,[3] it ought to have found its way eastwards, and further excavations in the Indus valley may reveal its existence there.

An interesting representation of the bismar is found on the Gandhara relief from the Swat valley now in the British Museum, depicting the legend of King Çivi.[4] King Çivi is seated on a stool; beside him are a woman and a kneeling man with a knife; further to the right stands an attendant with a bismar and then the god Indra (fig. 1).

Fig. 1.—Gandhara Relief: Swat Valley.

(*By Courtesy of the Trustees of the British Museum.*)

This bismar corresponds very closely with the Malabar specimen and the Danish steelyard; a similar bismar also occurs on the Amaravati tope. The same legend appears on one of the frescoes at Ajanta (fig. 2), but the bismar is replaced there by the usual scales. Thus, between the IInd or the IIIrd century A.D. (the dates of the Amaravati tope and the Gandhara relief) and the Vth century A.D. (Ajanta), a change occurred in the iconography of the legend, and whereas the "Eurasian Artist," to use Foucher's expression,[5] of the Gandhara school considered the bismar as the most appropriate symbol of weighing, the Indian artist of the Ajanta frescoes reverted to the use of scales.

As by the IInd century A.D. both Hellenistic and Roman art were influencing that of Udyana and Gandhara, it may seem at first as if the use of the bismar is to be traced as a result of Western influence in Indian art. The study of ancient Indian coins, however, proves that this assumption is incorrect and shows that the bismar was in use in India in the days of the Maurya dynasty and even of the Nanda kings.

FIG. 2.—FRESCO IN CAVES OF AJANTA.

(By Courtesy of the Authorities of the Victoria and Albert Museum.)

Among the many "punch-marked coins" (purāṇas) at the British Museum there are several with the sign of the bismar. These purāṇas ("ancient") are rectangular (fig. 3) or circular (fig. 4) pieces, cut from a hammered sheet of copper and clipped to the proper weight. On the rectangular purāṇa from Taxila [6] the obverse bears the sign of the bismar and the inscription "DOJAKA" in Kharoshthi script. On the reverse side is the Brahmi inscription "NEGAMA," which Cunningham [7] explains as the Gandharian *Nekama*, "custom, habit or use." Dr. L. D. Barnett kindly informs me that he considers that "Negama" can be equated with "guild," and that "Dojaka" seems to be a personal name; he also thinks that the dash over G (fig. 3) has no phonetic value. This last consideration is of importance, as on metrological grounds the weight of "Taxila, No. 2," must be considered as a unity and, therefore, the stroke may have the same meaning.

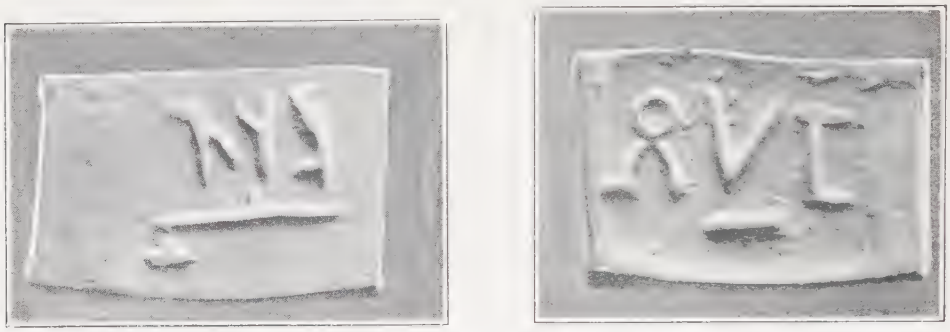

FIG. 3.—PURĀṆA ("TAXILA, NO. 2"; BRITISH MUSEUM).
(*By Courtesy of the Trustees.*)

According to Bühler,[8] purāṇas are guild-tokens and were struck by communal guilds or by goldsmiths and silversmiths. Rapson [9] considers these tokens to be of "an ancient form and designs, of purely native art, unmodified by any foreign influence." Thus we can say that somewhere about 300 B.C. the bismar was selected by the guilds and crafts of ancient India as indicative of the act of weighing.

Another token or coin with the bismar on it is that from Ayodhya (fig. 4) (British Museum Catalogue, ibidem, No. 3); it bears on the reverse the sign of the svastika over a fish. The coins from Ayodhya were first published by Col. Rivett-Carnac in J.A.S.B., 1880, XLIX, 139; he described the bismar as "Thor's hammer"; Cunningham took it to be an axe. But Vincent A. Smith's identification [10] with a steelyard seems to be the correct one and is accepted by the leading authorities.

FIG. 4.—PURĀṆA ("AYODHYA, NO. 3"; BRITISH MUSEUM).
(*By Courtesy of the Trustees.*)

Very interesting results arise from the consideration of the weights of these "bismar" coins. The weight of the Taxila coin is 107 grains, or 6.93 grammes; the weight of that of Ayodhya is 36 grains (2.33 grammes). Thus they stand in the relation of 1 to 3, and obviously belong to the same system. This cannot be the Mesopotamian system of the "daric," as even DI (=8.19 grammes) [11] is much heavier than 6.93 grammes, and the whole Egyptian system of the "peyem" (from 7.38 to 8.10 grammes) is heavier too. The Egyptian gold-standard "beqa" (from 6.09×2 to 6.81×2 grammes) is closer but still too light. On the other hand, the Mohenjo-daro and Harappa weights, published by Sir John Marshall,[12] belong to the same system as our purānas. The Mohenjo-daro weights are of uniform shape, rectangular or cubical, and are made of a hard chert. The system is binary for the smaller weights, and then decimal. The most frequent weights (32 out of 120) stand in the ratio of 16 to the smallest specimen and have a mean value of 13.71 grammes; the next class (22 out of 120), ratio 8, has a mean value of 6.82, with limits from 6.31 to 7.27 grammes. It is to this class that the Taxila coin belongs.

In spite of the fact that the system is binary, there appears a fairly numerous class between the ratios of 2 and 4, the class C of Mr. Hemmy, which he puts at $\frac{1}{3}\times 8$, with a medium weight of 2.28 grammes. Among the numerous weights brought from Susa by the de Morgan expedition and now handed over to me for examination, there are several specimens of that weight, belonging to a special Susian scale, which I would like to call provisionally the "Insect Standard." It is interesting to note that it was found expedient at Mohenjo-daro to include the Susian weight in the system. The Ayodhya coin of 2.33 grammes belongs to this class. Thus metrology supplies us with a definite link between the Indus civilisation of the IIIrd millenium B.C. and that of the Mauryan kings of the IVth and IIIrd century B.C.

I wish to acknowledge my indebtedness to the Director and Trustees of the British Museum for their permission to reproduce the Gandhara relief and the punch-marked coins, and to the Authorities of the Victorian and Albert Museum for the Ajanta fresco. I am particularly indebted to Mr. Sidney Smith, Keeper of the Department of Assyrian and Egyptian Antiquities, to Dr. Barnett, Keeper of the Department of Oriental Manuscripts, to Mr. John Allan, Mr. G. C. Brooke, and Mr. E. S. G. Robinson, of the Department of Coins and Medals, and to Mr. K. de B. Codrington, of the Victoria and Albert Museum, for their kind assistance and information on many points of archaeological and numismatical interest. It is my pleasant duty to put on record my sincerest thanks to Colonal P. K. Koszlov, to whom I owe my first initiation to the Gandhara culture.

N. T. Belaiew.

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PATHOLOGY AND ART AT EL AMARNA.

In the *Zeitschrift für Aegyptische Sprache,* Band 68, Zweites Heft (1932), pp. 114–119, Herr Felix Proskaues, dissatisfied, as we all are, with the various suggestions offered in explanation of the peculiar conformation of the human body displayed in Amarna art, puts forward yet another theory. He believes that the artist reproduced carefully and correctly what he actually saw, and that the unusual anatomical features depicted were the result of the disease of rickets—affecting not only the royal family for generations, but long rampant among the people. These features, he says, are characteristic of rickets, and the pelvic deformity proper to the disease, he thinks, may fully account for the peculiar head-shape special to the art.

It sometimes happens that theories become stereotyped merely for lack of contradiction, and the purpose of this paper is to test the grounds on which this suggestion rests. It is better to have no theory than a false one.

The writer in the *Zeitschrift* holds that rickets had been widespread in Egypt since the time when the Heliopolitan priesthood flourished, and that the influence of that priesthood derived from the discovery of the healing powers of the sun. The idea that these priest-physicians at their medical school actually antedated discoveries thought to be new in the XXth century is attractive; but no evidence is offered. Similarly, it is alleged that Akhenaten's worship of the sun was due to his recognition of its curative effect on his rachitic condition. Putting aside the improbability that so diseased a nation could have survived so long and accomplished so much, we may first consider whether the presence of rickets in Ancient Egypt is a thing we might reasonably look for.

Rickets is caused by deficiency in certain food factors and by lack of sunlight. Its occurrence in sunny Egypt is compared by Herr Proskaues to its presence in modern India, where the people are driven indoors on account of the heat. But the cases are not parallel: such an indoor life is not called for by the less intense heat of Egypt, and the evidence would seem to show that the Ancient Egyptians led an outdoor life—the women moving about freely in farm and market, and joining their men in outdoor sports. Moreover, Ancient Egypt is being compared with modern India. We have no evidence that rickets existed in ancient India, and we know that as late as 1917 it was rare in Kashmir [1]; and further, its growing prevalence in tropical countries is definitely associated with the increasing use of artificial foods deficient in vitamines.[2] In addition, we have in all Mohammedan countries the unhealthy seclusion of women, while the excesses of the purdah system in India are productive of serious bone disease with which rickets is associated, all this being of comparatively modern origin. There is no reason to think that the food of the Ancient Egyptians was wanting in vitamines. It comprised wheat, barley and other grains, vegetables, fresh and dried fruit, meat, fish, bird, milk and honey, all of which except honey are supplied with the vitamines necessary to nutrition. We need concern ourselves only with the anti-rachitic vitamine D, and this is found in the fat of meat, in

bird and fish, in radishes, freshly dried dates and figs, and abundantly in milk, whether of cow, buffalo, sheep or goat. In all these the vitamine is found fully formed, but in certain other foods, including wheat and other grains and fresh grapes, figs and dates, there exists, not the vitamine itself but its precursor ergosterol. When the violet rays of sunlight reach the skin in the presence of the calcium and phosphates belonging to the body, they act upon the ergosterol which has found its way towards the surface and form vitamine D. Even if the poorer people ate little flesh-meat, it would be of small importance, for vitamine D is contained only in its fat and that in small quantities. Of the foods containing either the vitamine or its precursor and of the sunlight needed to effect the biochemical conversion required, there cannot have been any shortage.

We have a right then to demand very definite evidence for any assertion that rickets was present in the land, and for this Herr Proskaues adduces the prevalence of dwarfism. It is true that dwarfs were well-known in Ancient Egypt, but they were not rachitic dwarfs. He figures a specimen dwarf, one of the Pataiki ("Patäkenfiguren") of late times. From the outline of the figure given here (fig. 1), it will be seen that this dwarf owes his condition to the disease called achondroplasia, which differs from rickets both in origin and manifestations.

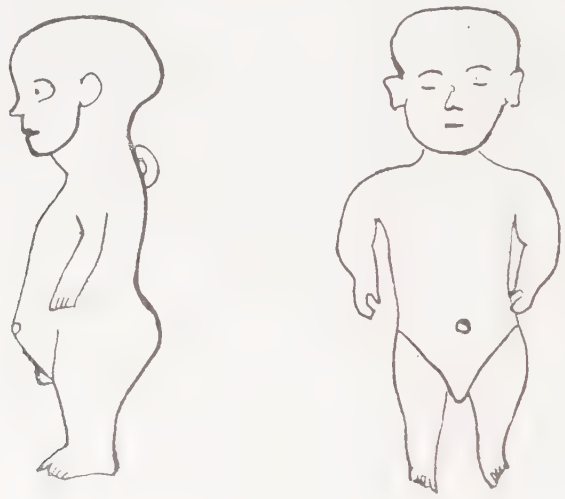

FIG. 1.

The following are the chief characteristics of the achondroplastic dwarf: the head is short compared with its breadth, with a high vault and protruding forehead; the bridge of the nose is sunken. The trunk is of about normal size, but appears large on account of the short limbs; the legs, often bowed, are short, especially the thigh-bone, and to this the diminutive height is due; the arms are similarly reduced, especially the upper arm. These are the features of the Pataiki, including the one figured, and of most of the dwarfs represented in statuary and reliefs; it is also the form of the hieroglyphic determinative for the word dwarf in the Old Kingdom, as seen in the inscription of Herkhuf.[3] Dwarfs figured in the tomb of Ankh (fig. 2) show the characteristics well[4]: the body of the well-known statuette of Khnumhetep at Cairo is typical, and there are very few dwarfs that cannot be definitely referred to this class.

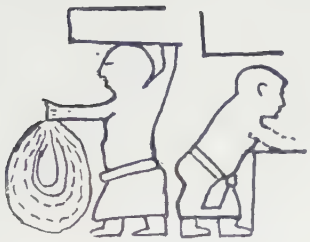

FIG. 2.

FIG. 3.

FIG. 4.

The rachitic dwarf is different. The bones of the head form bosses at the sides and front, producing an appearance of squareness which the artificer might be excused for confusing with the short head of achondroplasia; for in spite of the extraordinary lifelikeness of his effects, the Ancient Egyptian artist is not accurate as to anatomical detail. But he could not and did not fail to note the different proportions of body; for the marked disproportion between trunk and legs does not exist in rickets even though the height may be reduced. On the other hand, the bow-legs or knock-knee may be more in evidence, while the constriction of the thorax known as Harrison's sulcus and the flat pelvis are proper to this disease. Two dwarfs figured at Beni Hasan might be considered rachitic: fig. 3 (B.H. II, xxxii) is so bow-legged as to suggest this disease; fig. 4 (B.H. II, xvi) fails to show the definite disproportion between trunk and legs, though the arms are short. But such figures are rare compared with the other type and must be judged in relation to the evidence as a whole.

There are not many dwarfs at Amarna: six figures can perhaps be reduced to two individuals, for they are always in pairs and the pairs resemble one another so strongly that we may fairly regard the persons [5] represented as the same each time (fig. 5, A, B, C).

FIG. 5.

Five of these figures, and probably all six originally, have their feet turned inwards, a condition due to talipes. Talipes is of a pathological origin quite different from rickets. It is accompanied by a shortening of the affected limbs which if bilateral would produce diminution of stature, and it may be that this is all the artist meant to convey: yet we cannot but note that these stumpy figures have something of the proportions of achondroplasia and none at all of rickets, thus showing what the idea of a dwarf suggested to the artist's mind.

Leaving the evidence of art for that of osteology, we find a persistent negative to the presence of rickets. Among the records of several thousands of Ancient Egyptian skulls examined in this country, it is impossible to find a reference to a rachitic condition. The excavators in Nubia,[6] in the examination of some 6,000 bodies found no sign of rickets, and they note that Dr. Elliot Smith had the same experience in the examination of large numbers of bodies from Egyptian sites. They conclude therefore that "Rickets was almost certainly unknown in Egypt and Nubia up to the first few centuries after Christ." Elliot Smith and Dawson in their *Egyptian Mummies*[7] record that "no true case of rickets . . . has been found in any ancient Egyptian remains"; and Prof. D. E. Derry is good enough to inform me that this is his experience also.

Coming now to the royal family in particular, Herr Proskaues evidently feels—and his readers must agree—that the presence of rickets in a family with all the advantages of food and hygiene at their disposal does need explanation. He finds it in their heredity and suggests that a streak of "Bürgertum"—and therefore of rickets—had come in through Tiyi. He does not offer any evidence that Yuia and Tuia were either "bürgerlich" or rachitic, and their tomb and mummies indicate neither.[8] He appears here to be using the term heredity in the strict scientific sense, denoting the transmission of a condition or disease directly from parent to child. The hereditary nature of rickets, however, is by no means to be taken for granted: some evidence for it has been offered, but the consensus of scientific opinion at present is to the contrary, though poor resisting power towards it may be congenital.[9] In discussing the remarkable length of head which the art seems to attribute to Akhenaten and his family, the ground is shifted to natural selection, the view being that the flat pelvis of rickets acting for generations would eventually modify the head-form of the race, through the greater facility with which narrow-headed individuals would be born. The long narrow head, we are told, would become hereditary—hence arose the pathological dolichocephaly of the royal family; and as time went on, so prevalent did the rachitic head and body become that in the late period it had acquired a stereotyped representation in the Pataiki. To the assertion that this diseased race had power to modify its racial head-shape, we must reply that head-form cannot thus be permanently altered; that in fact unusual length of head did not prevail in the XVIIIth dynasty; and that flat pelves prevailed at no time in Ancient Egypt. The ratio of length to breadth of the head is a racial character and, beyond ascertainable limits of variation, does not normally change except in the presence of racial admixture. The breadth-length ratio proper to the race exists in pre-natal life, but to a less degree than after birth,[10] and the new-born head is a little wider proportionally than it afterwards becomes.[11] As the average length of the head at birth is only $4\frac{3}{4}$ inches and its breadth $3\frac{5}{8}$, this ratio can be a very small facilitating factor as compared with the extensive moulding and overlapping of the still soft bones and tissues that must and does take place in order to allow the head to pass at all. Indeed, if it were not entirely negligible, the whole world would by the same argument become dolichocephalic, for the same difficulties exist in the healthy pelvis, though to a less degree than in the rachitic one.

Change of head-shape has been induced experimentally in individual rats by depriving them of vitamines,[12] but even had the Egyptians been short of vitamines this would not help the argument, for the experiment did not bear on heredity and the change induced was a widening, not narrowing of the head. The typical head of rickets, as we have seen, is wide—the very last shape to facilitate birth in a flat rachitic pelvis.

Two other factors productive of dolichocephaly are brought forward by the writer in the *Zeitschrift*: one is a pathological condition of the mother affecting prenatal life, but very rare and not hereditary; the other a pulling on the head by the neck muscles during hard muscular work. Both of these he dismisses as not applicable to Ancient Egypt and we may certainly do the same.

How fantastic are these assertions of progressive rachitic dolichocephaly may be seen from a study of the facts of craniology, as set forth in Dr. G. M. Morant's *Study of Egyptian Craniology from Prehistoric to Roman Times.*[13] From the measurements by himself and other competent observers of over 5,000 skulls, he takes the mean measurements for each series. Only the cephalic index need be considered here, and in this is seen a steadily decreasing degree of dolichocephaly as time goes on. Figures from one of the many tables given will illustrate the process:—

Early Predynastic series; mean C.I.	71·7
Late ,, ,, ,, ,, ...	72·1
Dyn. VI to XII ,, ,, ,, ...	73·6
Dyn. XII to XV ,, ,, ,, ...	73·1
Early and Middle Dynastic (El Kubanieh); mean C.I.	74·4
Dyn. XVIII to XXI; mean C.I.	75·1
Dyn. XVIII to XXI; mean C.I.	75·1
Dyn. XXVI to XXX; ,, ,, ...	75·1
Ptolemaic series; ,, ,, ...	73·1

With the last may be compared another contemporary series by Broca giving a mean C.I. of 76·8.

Of the royal crania belonging to dyn. XVIII,[14] Thothmes II, who died 130 years before Akhenaten began to reign, is the most dolichocephalic, with an index of 72·7. His successors have respectively 76, 75 and 77, while the skull formerly attributed to Amenhotep III, but which may belong to a later king,[15] has an index of 76.

With the skull found in the Tomb of Tiyi and thought to be that of Akhenaten there appears a remarkable change, for the skull is flattened and wider than any skull of the dynasty except that of Ahmes, which owing to its correspondingly increased length is still dolichocephalic. The skull from Tiyi's tomb has an index of 81 and so has that of Tutankhamen which resembles it in form. Prof. D. E. Derry[16] believes the former to be that of Smenkh-ka-ra and because of the similarity thinks the two were brothers, sons of Akhenaten but not of Nefertiti—or at least that they were nearly related. If this were so, it would not be unreasonable to conclude that their father may have had the same sporadic head-form, and that this broad head is what the Amarna artist was trying to express. Its transference to the court would be complimentary and no one need be accused of rickets.

Nefertiti seems to be regarded by the writer in the *Zeitschrift* as certainly an Egyptian and therefore subject to the national malady. We do not know what shape her head was: in the crown she usually wears it is quite obscured, and though in statuettes[17] it appears elongated this is obviously due to a head-dress. In fig. 6 and fig. 7[19] it is of perfectly normal form.

FIG. 6.

FIG. 7.

As to body, Herr Proskaues seems to credit Nefertiti with a flat pelvis, constricted thorax and flat feet, all of which might be expected in extreme rickets. It is true that she sometimes appears with a pinched torso as in fig. 6, but on such occasions she is dressed in elaborate garments and engaged in religious rites. At other times, and far more frequently, she is depicted with a perfectly well-formed torso as in fig. 8,[20] while the profile of statuettes suggests a pelvis far from flat.

FIG. 8.

The evidence of osteology, though not exhaustive, is such as to place a heavy onus of proof on anyone asserting the prevalence of a flat rachitic pelvis, for no such pelvis has ever been recorded. Owing to the destructibility of the part, measurement is too often impossible; but the Archaeological Survey of Nubia records eleven pelves showing abnormal features, of which nine were measurable, and so far from showing flatness they were all unusually round. The most important diameter as regards flatness is the internal conjugate; that

is, the distance between the sacral promontory and the posterior margin of the pubis. If this, multiplied by 100, be divided by the longest diameter of the brim at right angles to it, we obtain the brim-index. Fig. 9 will make this clear.

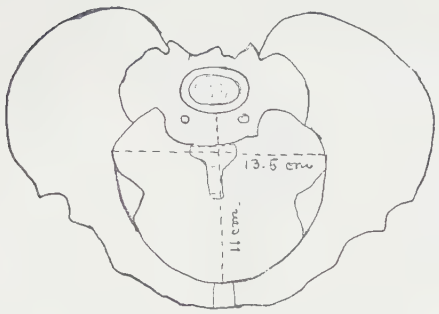

FIG. 9.

FIG. 10.

FIG. 11.

The normal index in modern European female pelves is 81·5 : a figure smaller than this will indicate flatness, a larger one the reverse condition. Now, of the pelves from Nubian cemeteries, ranging from Pre-dynastic to Early Christian times, two have indices showing a slight degree of flatness (but no rickets), namely, 79 and 81. The remaining indices are 82·9, 87, 88, 92, 97, 99, and 100, the last figure representing a brim equal in both diameters, the so-called round pelvis. In the wall-case behind the Nubian Pathological Collection in the College of Surgeons is a similar pelvis from Saqqara belonging to dynasty VI, to which Prof. Derry appends a note to the effect that this form is common among the women of noble families at the period. Thus almost every abnormality recorded is in the opposite direction to the one suggested by the writer in the *Zeitschrift*. Turning now to the Amarna Princesses we find their heads quite consistently represented as long, a condition which cannot have resulted from rickets. The appearance may be due merely to a mode of dressing the hair, as suggested by Dr. M. A. Murray ; on the other hand, if Smenkh-ka-ra and Tutankhamen were their half-brothers, their peculiar head-form might conceivably be shared by the half-sisters and be depicted by the artist in this way. The same remarks apply to their bodies as to that of Nefertiti : their putative "Harrison's sulcus" appears only when they are in full dress and occupied in religious rites, as in fig. 10 [21] ; otherwise, and often on these occasions also, their thoraces are perfectly normal (fig. 11).[22]

All the family appear with flat feet and this, as Herr Proskaues says, does occur in rickets ; but it is far from being diagnostic, for there are many conditions which cause a relaxation of the ligaments of the foot, some general, and some merely local. It would be difficult to suggest a condition which would apply to most of the nation at the same time, and it would be admissible to believe that the artist, like some of his predecessors, is either depicting a shoe or has chosen to ignore the dictates of the canon.

All the family too have more or less protuberant abdomens and fat thighs, and so have all the high nobles. A rare disease has been suggested for this in

the case of Akhenaten,[23] but a rare disease would not affect the whole court, and we have tried to show that as far as rickets is concerned Amarna must be given a clean bill of health. Perhaps it is only a stylization of the king's obesity. But the aim of this paper is not to adjudicate among positive theories; it is only to combat a false and harmful one, even though the result be "putting us to ignorance again."

E. M. Guest.

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19. Davies, *Amarna*, III, pl. xxxiv.

20. *Ib.* I, pl. xxx; *cf.* I, xvii, xxii, xxvii; II, vii, xii, xiii, xvi, xxxii, xxxiv, xli, etc., etc.

21. *Ib.* V, xxvi, xxxix; *cf.* VI, iv.

22. *Ib.* III, vi.; *cf.* I, xxvi, xxx; II, x, xii, xviii, xxxiv, xxxviii, etc.

23. *Cambridge University Medical Society Mag.*, 1926, IV, 37.

AN IVORY IN THE PETRIE COLLECTION.

THE carved ivory shown in fig. 1 was purchased by Professor Petrie at Naqada some years ago. It was said to have come from Ballas.

Representing, as it apparently does, a female figure in the flounced *kaunakes* familiar in Ancient Mesopotamian and Cretan Art, it is of great interest and is, as far as is known, unique.

It was published in " Prehistoric Egypt " (pl. I, fig. 3), and its provenance and possible sequence date (45) are given in the text, but without further comment. It is strange that its interest should have attracted so little notice among students of Prehistory.[1]

FIG. 1.

Until recently no examples of this costume from Mesopotamia could be dated earlier than about the middle of the 3rd millenium B.C. (from Crete the earliest example is several centuries later), but recent excavations at Ur have disclosed it on seals of Queen Shubad, of which an example is given in fig. 2, and at Kish on seals of the pre-Flood period (fig. 3), both of which, on the most moderate reckoning, bring the costume within the minimum estimate of the date of the Proto-dynastic or Early Dynastic age.

1. It is referred to by G. D. Hornblower (Some Predynastic Carvings, *J.E.A.*, vol. XIII, Parts III, IV, page 241) in a footnote, as a figure in a skirt or dress of the Kaunakes type.

Assuming that the object is correctly diagnosed as of this period, one would naturally associate it with men of the type represented by the other ivory figurines shown on the same plate representing gowned, full-bearded men [2] with shaven upper-lips (fig. 4), and the more aquiline strongly bearded types exemplified by the captive of Setet (on a carved ivory gaming-rod, fig. 7A) and the figure prostrate before the bull on the Narmer palette (fig. 6).[3]

2. This remarkable figure (head only given here) is in the Ontario Museum. A photograph of it is published by Hornblower, *loc. sit. supra,* from which the figure is drawn.

3. These two aquiline bearded types (*vide* also fig. 5 of later date) are by several authorities regarded as the Anu, the troublesome Bedawi of ancient Egypt. They may well be cross-breeds of aquiline "strong-beards" (Meshwesh, Amorites, *vide* figs. 12–14) with the Hamitic aboriginals in Southern Egypt, as the Tehenu appear to have been in Libya.

Newberry long ago drew attention to some remarkable evidence for community of certain cult-symbols in Minoan Crete and Proto-dynastic Egypt,[4] and Sir Arthur Evans has collated the striking indications of their cultural relations, comprising resemblances in costume, bows, shields, physical types (figurines), button-seals and boats, pointing to a considerably advanced civilisation in the Delta.[5]

Among the figurines are bearded types (fig. 7) which, in view of the above, preclude any need to regard the Egyptian tusk-figures as importations from Mesopotamia or the Persian Gulf by the Red Sea Route.[6]

Examples are given (from Egyptian art and elsewhere) of Meshwesh of Libya (evidently a mixed race, figs. 12, 14), Tehenu (figs. 9, 10), Amorites (fig. 13) (a blonde people regarded by Professor Sayce on philological grounds as of Mitannian origin), and a (? late Bronze Age) type from Cyprus (fig. 8). "All the evidence at our disposal," says Sir Arthur Evans, "archaeological, religious, and linguistic, points to root connection between Crete and Anatolia."[7] Here, then, we have the source perhaps of these bearded peoples who would certainly have settled in Cyprus before they voyaged as far afield as Crete.[8]

12

13

14

4. P.S.B.A., xxviii, p. 73.

5. Presidential Address. J.R.A.I., LV, 1925 ; *vide* also Newberry, P.S.B.A., 1906, p. 68. The figure-of-8 shield (in question) quickly died out in Dynastic Egypt but persisted in Libya with the round shield, as is evidenced by rock drawings. It is probably the prototype of shields of analogous shapes used by Hamitic and Libyoid peoples in N. Africa.

6. The route favoured as the line of cultural connection with Egypt of Mesopotamia by many Egyptologists.

7. In view of the Anatolian face-line (straight Grecian brow-and-nose-line) of the "Armenoid" Early Kings, Sir A. Evans's testimony of early maritime connection of Crete with the mainland to the East substantiates Dr. Elliot Smith's contention as to their Armenoid origin, and does not disprove Dr. Hall's suggestion that from their appearance they might be Cretans.

8. Sir A. Evans, *op. cit.*, advances the evidence above-mentioned as proof of proto-Libyan relations with Crete, in addition to the Anatolian connection. Regarding the Haau and/or Haanebu of the Delta (who from late Egyptian drawings were very Cretan in appearance), *vide* Newberry, P.S.B.A., 1906, 68, and Hall, *op. cit.*, p. 35.

The long-gowned bearded figure on the Gebel Araq knife-handle, the lower part of a gowned conqueror on the Ashmolean slate palette, and the gowned types portrayed on these carved tusks, all point to an established influence in Early Egypt of people with, probably, Mesopotamian culture, and possibly of Anatolian origin.[9]

ERNEST S. THOMAS.

9. Fig. 11 represents a Lesghian from the Caucasus, who, although moustached, suggests the tusk type. For possible connection of the ancient Egyptians with the Caucasus on mythological grounds, *vide* Sir F. Petrie, "Origin of the Book of the Dead", *Ancient Egypt*, 1926, part II.

SOURCES OF FIGURES.

1. *Prehistoric Egypt*, pl. 1, fig. 3.

2. The Royal Tombs of Ur, C. L. Woolley in *The Museums Journal* (Philadelphia), 1928, XIX, 1, p. 7.

3. From a seal-print in the Ashmolean Museum (by kind permission of the Keeper).

4. From pl. LXIII, *Journal of Egyptian Archaeology*, vol. XIII, Parts III, IV (1927).

5. From a drawing of a cross-belted captive on a pot from Semam, Nepata. *Liverpool Annals of Art and Archaeology*, X, Parts 3, 4, pl. 31.

6. From the Narmer palette.

7. From *Journal of the Royal Anthropological Institute*, vol. LV (1925), p. 216.

7A. From Petrie's *Royal Tombs*.

8. From a pottery head from Cyprus given to the Pitt Rivers Museum by Mr. G. D. Hornblower (by kind permission of the Curator).

9. Head of a Libyan from the Tomb of Seti I (Capart).

10. From a VIth dynasty temple at Abusir.

11. A Lesghian from Chantre, *Recherches Anthropologiques dans la Caucase*, I, IV, pl. 18.

12–14. From Racial Types, Petrie (Maspero, *Struggles of the Nations*).

THE MAT WEAVER FROM THE TOMB OF KHETY.

The picture from the tomb wall at Beni Hasan representing the Mat Weaver has already received much attention and study, notably by L. Klebs in "Die Reliefs des Mittleren Reiches" and by C. H. Johl in "Altägyptische Webestuhle", yet no definite conclusion has been reached on many of the points raised.[1] Some of the questions raised and discussed by these writers can, I believe, be answered by a comparison of the picture with the mat weaving of the present day in Cairo and other parts of Egypt; and others, if not solved so definitely, can at least be given an intelligent interpretation.

There are several drawings of the picture, published respectively by Cailliaud,[2] Champollion (fig. 1),[3] Rosellini (two versions),[4] Gardner Wilkinson (figs. 2 and 3),[5] and Newberry.[6] Those by Cailliaud and Rosellini are in colour.

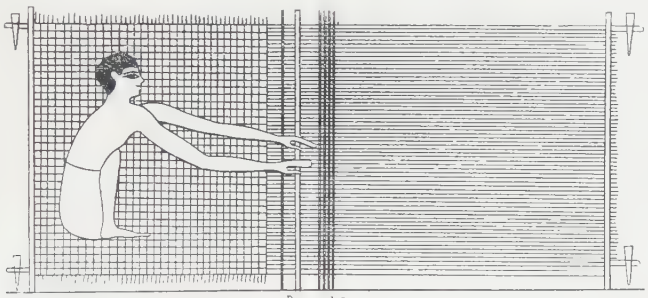

FIG. 1.

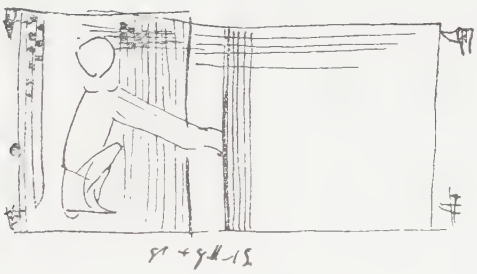

FIG. 2.

(By kind permission of Mrs. Mosley.)

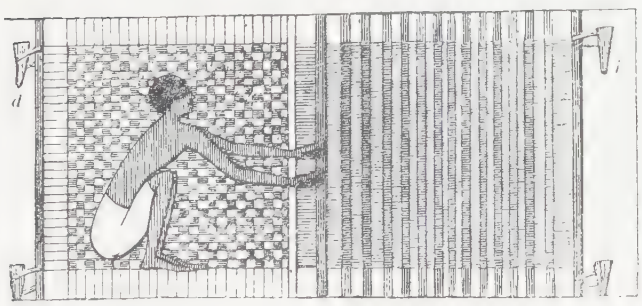

FIG. 3.

The Loom.

On a comparison of these drawings the loom appears to be very simple. They all agree in showing two beams, each fastened to two

pegs, with the warp stretched between the beams. Minor differences are that the lines showing the fastening of the pegs to the beams appear in Cailliaud almost like a hook, in the other drawings like a loop ; but this is not of any importance, the fastening was probably in the past, as in present looms of this class, simply a cord lashing the two together. All the drawings give the same simple horizontal loom, pegged out on the ground. In the coloured drawings the beams and pegs are coloured red (Cailliaud) or reddish brown (Rosellini), a colour I take, as do former writers, to represent wood. The bar seen passing across the centre of the loom may then be taken, from its similar colour, to be also of wood, and a part or appurtenance of the loom. Only one bar is shown, and this is in contrast with the picture of the loom in the Tomb of Chnemhotep, where two rods cross the loom as well as a third held in the weaver's hand.[7] We have then to consider the weaving as carried out with only one aid, whether for beating up or shed making, a wooden rod of some kind ; and we must turn to modern primitive practice to find out where and how this is done.

This type of loom pegged out on the ground is well known and is in use at the present day in Egypt, Palestine, the Sudan, and among the Bedu in Transjordania, North Africa and the Egyptian Desert, both for textiles and mats.

It is usually provided with a rod heddle and a shed rod, but I know of two types more primitive than this : one is the loom used for weaving blankets by the Hadendoa (Red Sea Hills), who make no heddle but use only a shed rod ; the other is the horizontal mat loom of Egypt and Palestine which is provided only with a rod pierced with holes.[8] Other wooden appliances used occasionally with this type of loom and which might conceivably be shown in a picture are the long sword beater, and a wooden support sometimes placed under the warp ; the "donkey", as it is called, because it bears the warp on its back.[9] The rod shown across the warp in the Ancient Egyptian picture may then be one or other of these four aids to weaving, and we must see which best agrees with the way in which it is represented—the shed rod, the rod with holes, a sword beater, or a warp support. The last-mentioned, a warp support, can be ruled out at once because the rod is shown as passing over the warp and a support is under it ; also a support is always placed near the end of the loom, except when the work is just beginning, not in any case near the centre. Nor can the rod be a sword beater, again because it is above the warp and with the weaver's hands upon it in a position quite other than that in which the sword would be held. The shed rod is in no better case, for in use it lies between the warp threads and only the ends can be seen clearly, standing out at the sides. But when we come to consider the rod with holes we see at once how well it agrees with the rod in our picture. As the warp threads pass through the holes in the mat-maker's rod, the rod is, of course, seen clear above them, as it is in our photographs and also in the picture from the Tomb of Khety ; and another striking likeness is seen when the position of the weaver's hands in the picture is compared with that seen in the photograph of the blind mat-maker (fig. 6), who is beating up with both hands on the rod.

The holed rod or, as I would prefer to call it, the holed beater-in, receives further support from the fact that Sir Flinders Petrie found a portion of one at Kahun,[10] now in the Manchester Museum. This piece of wood measures in length 96·8 cm. × 8·p × 3·p and is perforated by 28 holes about 27 to 40 mm. apart. Petrie termed it a "weaver's beam for making rush mats," and commented on its likeness to the beam used by the Egyptian mat weavers of the present day. I find it very similar in appearance to those I have seen in use.

Those I have measured were about 2 metres long and the holes were drilled into them at intervals of a little more than a centimetre; one had about 180 holes to the 2 metres, which is a closer setting of the holes than in the Kahun example. The modern examples vary slightly in size, and no doubt the ancient ones did too; probably the Kahun beater was used for a coarser kind of mat. It is curious to observe that the holes, which can be clearly seen in fig. 7, are worn in precisely the same way as those in the Kahun beater; they remain narrow at the top, and widen out irregularly at the sides and base from friction during the beating. In date the Kahun find is said to be of the XIIth dynasty, and is therefore of the same period as the Beni Hasan picture.

Warping and Weaving.

It seems then that we can safely accept the closest comparison between the ancient and the modern mat loom, and can go on at once to consider the weaving to see if there, also, we can find any enlightening resemblances. Unfortunately, there is only the one ancient picture of mat weaving, and none of the warping, so that we can only find one moment in the continued action of making a mat to compare with it.

FIG. 4.

(*Photos: Masraff, Cairo.*)

FIG. 5.

The modern warping is shown in fig. 4; the worker walks up and down carrying the twine warp over both beams, through the holed rod, and over or under a string at the end of the loom that keeps the crossing, although for the particular kind of mats that he usually makes a crossing is quite unnecessary.

It may be that the crossing is useful for some type of mat that I did not see, or it may be that the habit of putting it in survives from a time when this kind of loom was in more general use than now; this string reminds one of the laze threads which are seen on the loom of Chnemhotep.[11] The twine warp is put through the holes with a large steel needle, as seen in the photograph; it is difficult to carry a long thread in this way and the worker whom I saw made frequent joins in his twine. Three or four of the warp threads on either side are set up double or in a thicker twine, so as to make a strong selvedge.

An early stage in the weaving is shown in fig. 5, where the weaver is sitting on the ground behind the breast beam darning the strands of reed through the warp. It must be realised that this is sheer hand work throughout; the holed rod serves only to keep the threads separate and in their proper order. The darning has to be done entirely by eye and hand, and varies according to the pattern chosen; in fig. 5 the reed strand is being passed under two and over two of the warp threads, as is usual for the check pattern.

FIG. 6. (*Photo: Masraff*

When large mats are required, as for the mosques, two or more weavers sit together and they set in their strands of reed at the same moment, their speed and unanimity being a thing to wonder at. So that the weaving shall not be too bulky and also to serve as a guide, it is a common practice to leave one hole in the rod unthreaded where the strands of reed overlap. At the selvedge the weavers turn back the ends of the weft in and out of the selvedge warps and beat them in; but when patterns are being woven they will leave the coloured strands out to be cut off later, thus keeping a self-coloured border. The reeds used, chiefly *Juncus acutus, L.*, and *J. maritimus, Lam.*, are of a most agreeable pale yellow—whether natural or acquired by bleaching I do not know—and the favourite dyed colour is green. Many patterns are woven in these two colours, pale yellow and green, the one seen in fig. 5 is a simple check, and diamonds are shown on the mats hanging behind the workers in fig. 6, but some are very much more elaborate than these. In this photograph (fig. 6) the work has advanced further and the weavers are squatting on the half-finished mat; one of them is beating up with both hands on the rod.[12]

The attitude of the weaver in the Tomb of Khety is now perfectly intelligible. He is weaving a reed mat with a check pattern in the weft, and the work is so far advanced that he has to sit upon it; the moment caught by the artist is that in which he is beating up a throw of weft, and both his hands are on the beater-in. The colours of the mat, as described and also as seen in the coloured drawings, are green and yellow, which are, as already mentioned, to this day the favourite colours for Egyptian patterned reed mats.

So far we have met no difficulties; the drawings agree in the particulars we have examined, and they agree with actual observation of modern mat-making. But when we turn from the weaver in the picture to the right-hand side of the loom, the part of the loom beyond the beater-in, we see at once those differences in the drawings, some trivial and some serious, which have caused all the difficulties in their interpretation. We will take the trivial ones first. On this right-hand side Champollion (Ricci) (fig. 1) has 64 warp threads which run down to the check pattern in 35 squares; Cailliaud has a red warp varying from 41 threads from the back beam to the beater-in to 45 between the beater-in and a first throw of green weft, with 30 squares; Rosellini (No. 1) has a yellowish warp in which the threads are not indicated, except for 64 short threads sticking out at the outer side of the back beam, and 24 squares; Rosellini (No. 2) has a more abundant red warp-in of 115 threads and 26 squares; Gardner Wilkinson (fig. 3) has 72 warp threads and 27 squares.

The correct proportion of threads on the modern analogy (fig. 5) would be two warp threads to each square of the check pattern, with probably eight threads or so extra for the selvedges; but this proportion is not given in any of the drawings, and in any case their variations are so great as to leave it quite uncertain what the number of threads in the original might have been. Fortunately, this is not essential to the understanding of the picture.

There are other far more serious discrepancies: in each drawing there are to be seen lines crossing the warp on this side, and in every drawing they are different. For example, Champollion (fig. 1) has 4 lines (each double) crossing the warp close to the beater-in; Rosellini (No. 1) has 5 lines across the yellow warp, painted over with green and so appearing as one band, while Rosellini (No. 2) has alternate green and yellow bands, 13 in all; Cailliaud has 19 bands, all green; and Gardner Wilkinson shows bands of 4 lines each, 13 in all, no difference in shade being indicated. In Newberry's drawing, the right-hand side is left blank, except for a small portion showing transverse lines at the top immediately beyond the beater-in; by the time his drawing was made that portion of the picture had suffered much and was probably unintelligible. In the attempt to get to the root of the matter, recourse was made to the original drawing by Gardner Wilkinson, a photograph of which was given me by Dr. F. Ll. Griffith and is published here, by kind permission of Mrs. Godfrey Mosley. Here again (fig. 2) the loom is clearly shown, with the check pattern on the left, "gr. and yellow" being written below, and the weaver is seated with his hands on a strong line across the warp. Beyond this line, a few lines of warp are suggested and 4 or 5 other lines crossing them. Of course, in comparing such a drawing with the completed and published one (fig. 3) one must make allowances for amplifications probably warranted by notes or memory. One thing is certainly confirmed by it, viz., that there *were* some lines crossing the warp in the original picture. Considering it together with the other drawings, another thing becomes equally certain, that these lines were not clear, and that they were differently

interpreted by each draughtsman who saw them. They certainly do need interpretation, be they few or many, for from the weaver's point of view there should be no lines there, except those of the unwoven warp. Various suggestions have been made to meet this difficulty. If the more elaborate drawings are accepted, and the bands crossing the warp regarded as a stripe pattern, then a plausible conjecture is that the picture shows a piece of weaving all but finished, in which the work has been begun from either end (a proceeding not unknown in primitive practice), the completed portion being in stripes and the portion to be finished being in check pattern; when the weaver reaches the centre the warp is to be cut there, and the beater-in released, leaving two small mats complete. But if, as seems far more probable, those drawings are more nearly correct which do not give so many and regular bands, then this explanation will not serve. A second explanation that the check pattern is a mat laid over the completed weaving and has nothing to do with the work is—rightly, in my opinion—rejected by Herr Johl as a counsel of despair. But there is another

FIG. 7. (*Photo: Masraff.*)

simpler explanation than these. If the photographs, figs. 6 and 7, are examined it will be seen that there are bundles of reeds lying across the warp beyond the beater-in. This is a common practice among mat-makers, which I have seen many times; sometimes the reeds lie loose, as in fig. 7, sometimes tied in bundles, as in fig. 6. The Egyptian artist did not draw in our perspective, but he did draw what he thought ought to be there and had often seen: and I must think that if he drew lines beyond the beater-in of a mat loom, it was because it was usual to see something there in the looms of his day. I suggest that the ancient mat weaver had the same habit as his descendants, and that the bands across the loom in the Tomb of Khety are intended to represent the bundles of green and yellow reeds lying ready to the weaver's hand for the completion

of his check pattern mat. It is easier to understand the ancient pictures when, because of some happy survival, we ourselves see what the artist saw.

I observed these points long ago, but I could not make them comprehensible to others for lack of illustration; the sheds and old warehouses in which the weavers work are often very dark, and the looms so close to the walls that to focus a camera is difficult. Fortunately, two years ago, when passing through Cairo, I secured the co-operation of M. Masraff, a specialist in press photography; and the weavers were willing both to show their skill and to have their photographs taken.

G. M. Crowfoot.

Footnotes.

1. C. H. Johl, *op. cit.*, says on page 34: "So bringt uns dieses Bild eine Fülle von Fragen, deren Beantwortung heute noch nicht möglich zu sein scheint."

2. F. Cailliaud, *Recherches sur les Arts et les Métiers*, pl. 18, 1.

3. Champollion-le-Jeune, *Monuments de l'Égypte et de la Nubie*, pl. 366, 2.

4. Rosellini, pl. 41.

5. Gardner Wilkinson, *Manners and Customs of the Ancient Egyptians*, 1837, vol. 3, p. 134; 1854, vol. 2, p. 86; 1878, vol. 2, p. 70.

6. Newberry, *Beni Hasan*, vol. 2, pl. 13.

7. The two rods are no doubt a rod heddle and a shed stick, and a sword beater is held in the weaver's hand.

8. A similar perforated rod is also used on some vertical mat looms, *e.g.*, on the mat looms of Lake Hule in Palestine and on some from Ceylon and Hong Kong described by Ling Roth, *Studies in Primitive Looms*, pp. 118–119.

9. It is also called the "chair," because the warp sits on it.

10. *Kahun*, p. 29, Ling Roth, *Ancient Egyptian Looms*, p. 21, fig. 24.

11. Ling Roth, *Ancient Egyptian and Greek Looms*, p. 7.

12. The holed beater is called either *madrub* (beater) or *misht* (comb-reed).

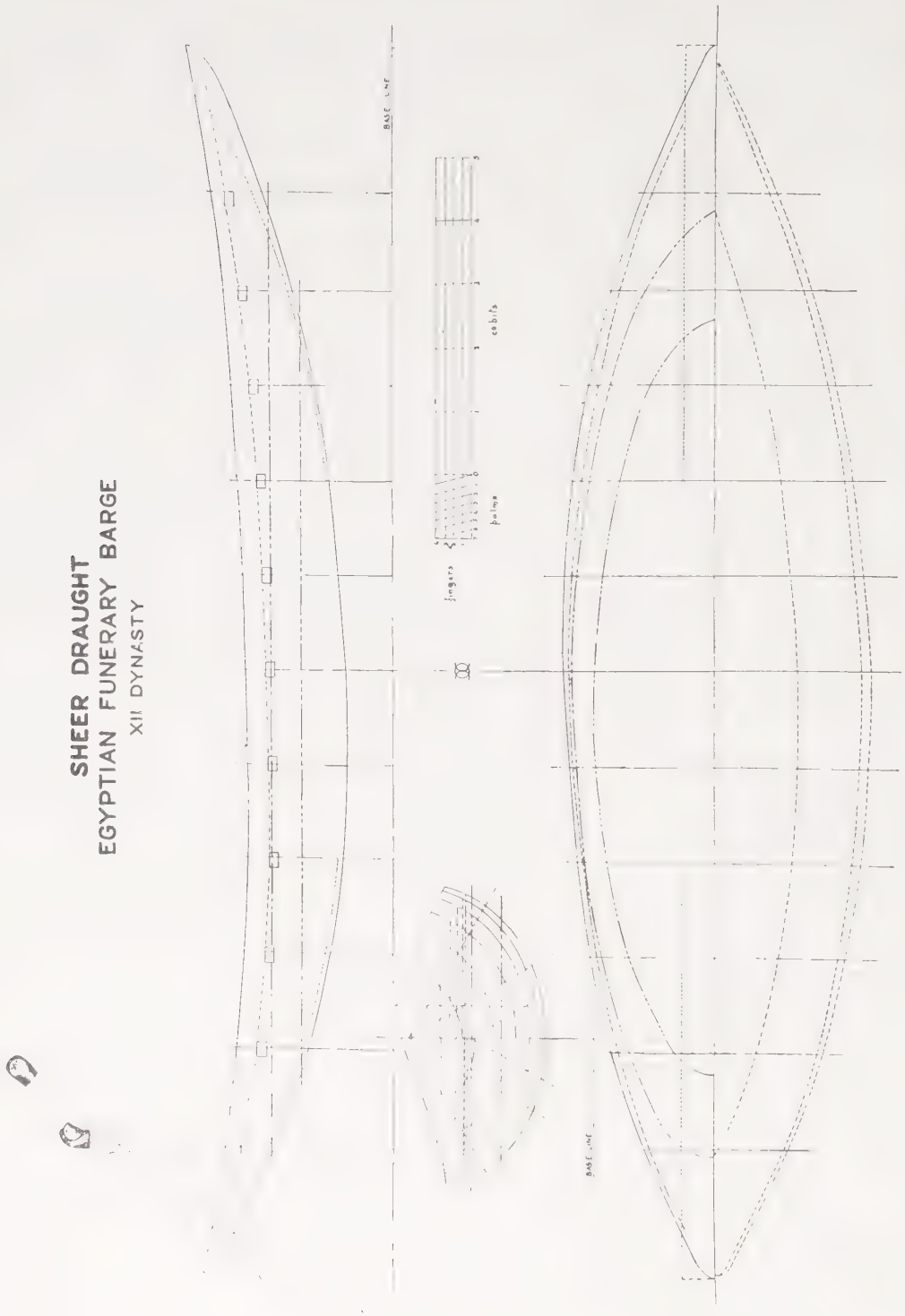

FIG. 1. LINES OF MODEL FUNERARY BARGE.

ANCIENT EGYPTIAN SHIP DESIGN; BASED ON A CRITICAL ANALYSIS OF THE XIIth DYNASTY BARGE.

The Ancient Egyptian shipbuilder built his ship without any framing. This is a fact that is beyond doubt. No framing of any kind, other than cross beams, is indicated in any drawing, nor is there any in the boats which have survived; further, Herodotus (ii, 96) makes a special note of this feature. It was not that the Egyptian did not understand the use of frame work, since models show that he constructed ship's cabins on a framed structure; No. 4918 in the Cairo Museum is an excellent example. The reason for the lack of framing was that the shape of his vessel made its use unnecessary.

Provided that certain conditions are fulfilled, a ship will keep its shape without the assistance of a rigid frame. When a vessel is afloat the water is pressing normally against the skin of the hull with a pressure proportional to the depth below the surface of the water. Suppose that the ship is turned over, the pressure then acts downwards, and the hull becomes analogous to an arch or a dome. A brickwork arch will stand up under a load if its curvature is such that the forces lie along the arch: the exact curve depends on the loading. In the same way the hull of a ship may be looked on as an arch under a definite load. It is quite possible to calculate the curvature which must be given to the bottom of a ship, so that it shall retain this shape under any particular loading. Generally, the forces will be the pressure of the water upwards (this represents the load on an arch) and the weight of the hull itself. This latter has no exact equivalent in an arch, as the weight of the bricks acts in the same direction as the load, whereas in a ship the weight of the hull acts against the load. It is best then to combine the weight of the planking with the water pressure and thus obtain a modified load. In an arch the total load is carried by the piers, which are subject to a side thrust arising from the tendency of an arch to spread. A ship has beams which supply the necessary support against spreading. A load placed on the deck will be transmitted to the skin planking at the ends of the beams; and it is this load which supplies the equivalent to the support given by the piers of an arch. Just as the piers push up against the load on the arch, so does a deck load push down against the upthrust of the water.

A ship being hollow, there is every inducement to place cargo inside. When this is done, the load acts directly on the skin of the ship, and to deal with this by mathematics involves considering every possible arrangement of the cargo and subtracting its effect from the upthrust. This was the method suggested for dealing with the weight of the plank. Applied to the cargo, the shape of the hull would have to be different for every cargo carried. In modern ships the weight of the cargo is carried by the frames, which are sufficiently rigid to prevent distortion of the skin plating. That, at least, is the idea in theory: actually a badly stowed cargo does sometimes strain a ship and cause it to alter shape. Cases of such alteration of shape have been known to be so severe as to break the ship.

It is most unlikely that the ancient Egyptian stevedore ever put a cargo *inside* a ship; it would have caused so many leaks in the hull as to be ruined by water. The ancient Egyptian pictures always show the cargo stowed on desk; although this may have been conventional, it is much more likely that it was a representation of actual fact. In the Deir-el-Bahari pictures of the Punt expedition a bill of lading is given, so there is no need for any conventional device to show that the cargo was on board.

Given a deck load, the ship becomes a form of arch and one shape of hull will suit practically any lading, or none. A framework is consequently no more necessary to such a ship than it is to a brick arch. Another point in connection with this is that the bottom is always in compression, and short pieces of wood are not detrimental to the strength of the hull. Under a load the water pressure would cause the planks to open inwards, hence, as Herodotus says, the Egyptian ships were caulked from within.

The foregoing argument leads to the conclusion that Egyptian ships must *all* have had more or less the same shape; at least all those that were *built* of wood. With no framing, it would have been impossible for the Egyptian shipwright to settle the shape by eye, except perhaps in the case of the smallest boats. It may be taken for granted that he had definite rules by which he determined the shape of a vessel. Possibly these rules were traditional and constituted "the mystery of shipwrightry." They were probably never written down, and may be completely lost.

As stated above, the general shape of an Egyptian ship was the same, no matter for what purpose she was used; it is probable that the only variations were in the ratio of length over all to maximum breadth. These are the only two dimensions which are ever given in any records. In consequence, the XIIth dynasty funeral barges which have survived may be taken as typical of an Egyptian ship. Permission was obtained from the Science Museum at South Kensington to take off the lines of the model there of the funerary barge in the Cairo Museum. This model is one-tenth the size of the original.

The result is shown in fig. 1. The scale attached gives cubits, palms and fingers for the original.

These lines were analysed mathematically to see whether a set of rules could be evolved by which the ship could have been built, given only the length and breadth. The result was extremely interesting; it was found that rules, well within the capabilities of the Egyptians, were obtainable; and that these rules agree with all known facts concerning Egyptian ships and can be applied to any size. In fact, using these rules a design for Hatsepshut's obelisk lighter can be made which agrees remarkably well with the Deir el Bahari carvings. Moreover, the design is a practicable one which would not have broken down under a 700-ton deck load.

It is not claimed that these rules were actually in use in Egypt, but some similar method must have been used.

Before discussing the shape of the ship, it should be noted that the Egyptians were familiar with the use of squared papyrus for drawing plans; they could and did work to scale. Further more, they used ordinates set up from a base to define a curve.

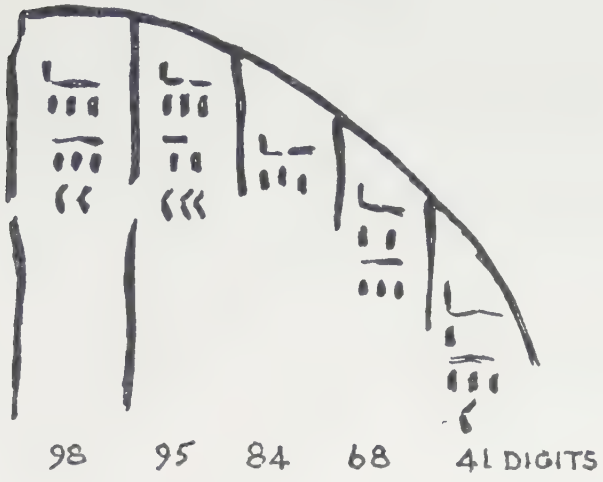

FIG. 2. EGYPTIAN DRAWING OF SETTING OUT A CURVE BY ORDINATES.

There is an ostrakon, probably of the IIIrd dynasty, from Saqqâra which shows a curve defined by ordinates (Somers Clark and Engelbach, *Ancient Egyptian Masonry*, p. 52); and fig. 2 reproduces this curve with the height of the ordinates reduced to fingers. The spacing between the ordinates is not stated; but a simple calculation shows that if a quadrant of a circle of radius 9 cubits 1 finger (or 253 fingers) be drawn, and a line parallel to the base and at a distance of 155 fingers, then ordinates spaced 40 fingers apart agree with those of the ostrakon.

Tabulating the results:—

Height of ordinate of arc of circle as calculated ..	98	94·8	85·0	67·7	41·0	0
Height given on ostrakon	98	95	84	68	41·0	0

If the calculated heights are brought to the nearest whole number, the agreement is exact save for the middle ordinate where the error of 1 is probably due to careless measuring on the part of the original draughtsman or to a clerical error, in writing 3 cubits instead of 3 cubits 1 finger. Any other spacing of the ordinates than 40 fingers converts the curve from a circle to an ellipse, but does not affect the height of the ordinates.

As early as the IIIrd dynasty, therefore, the Egyptian draughtsman was deriving curves from a circle, and defining them by means of spaced ordinates.

The principal curves of a ship are three in number: the profile or curvature of the keel, the plan of the deck, and the shape of the midship section. These give the greatest sections in three planes at right angles. When the ancient naval architect had determined on these three curves, he could give the dimensions of them to the shipwright who was able to fill in the rest by a known formula.

The figures for the South Kensington model barge, which are quoted in inches, must be multiplied by 10 for the model in the Cairo Museum.

The overall length is $39\frac{7}{8}$ inches and the greatest width is $9\frac{3}{4}$ inches—a proportion of 4·09 to 1; that is, the length is practically four times the maximum width. The depth from the top of the gunwale is 3·21 inches, or almost exactly

one-third of the greatest width. It may, therefore, be taken that the general dimensions of a Middle Kingdom ship were: beam, a quarter of the length; depth, one-third of the beam. The latter proportion was probably constant for all types of vessels, but the length to breadth ratio was varied according to the purpose for which the ship was designed, cargo boats having a ratio of 3 or less, whilst in warships and passenger vessels it was 4 or over.

The greatest width would not have been a practicable measurement to give to the shipwright; he would determine the shape of the ship by setting up the cross beams at known positions and measuring the length of each beam.

In the model the distance of the top of the central beam below the top of the gunwale is ·65 inches. If the depth of the ship is taken as exactly one-third of the beam, that is to say, 3·25 inches, it will be seen that the beam has been set down *exactly* one-fifth of the total depth. The overall length of the central beam is 9·35 inches, or 95·9 per cent. of the maximum width. In other words, the beam length can be obtained by shortening up the greatest width by 4 per cent. or one-twenty-fifth.

These proportions ($\frac{1}{4}$; $\frac{1}{3}$; $\frac{1}{5}$; and $\frac{1}{25}$) are too obvious to be mere chance; there is a strong presumption that they were standard ratios for design.

In fig. 3 is shown a very simple way in which the length of the main beam may be derived from the greatest width. A base line is drawn and $\frac{4}{5}$ of the half-breadth of the ship is marked off (AB). A perpendicular (AC) is set up equal to the depth from the keel to the gunwale; at this height a line parallel to the base is drawn and on this half the greatest width is marked off (CD). The two points on the horizontal lines are joined (BD). At a distance equal to $\frac{1}{5}$ of the depth, measured from the top, another horizontal line is drawn repre-

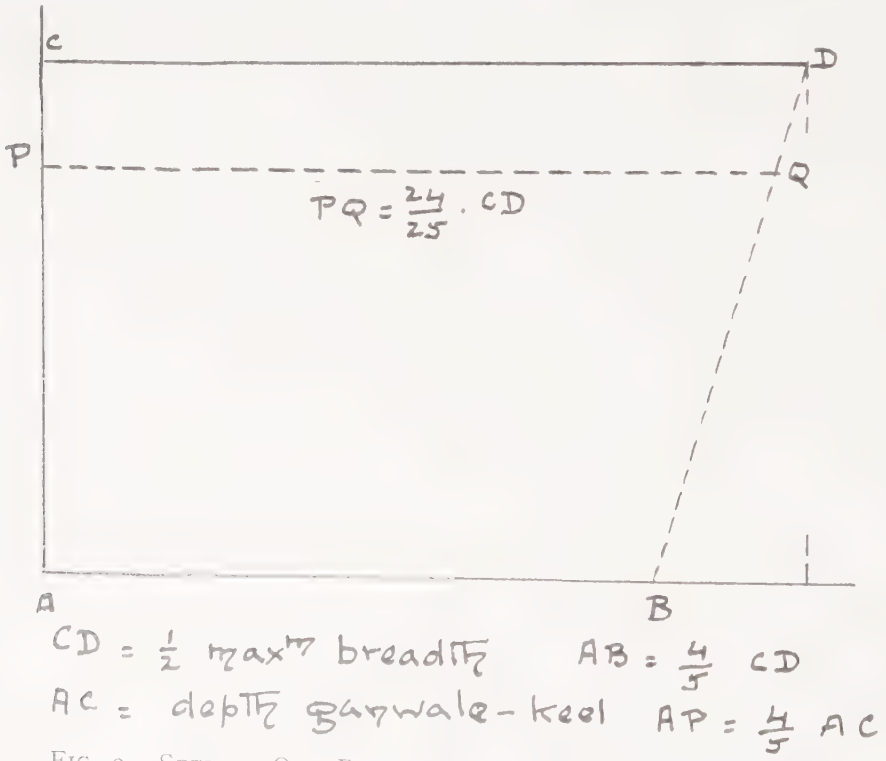

Fig. 3. Setting Out Proportions of Main Beam Section.

senting the beam, and the distance (PQ) from the perpendicular to the sloping line is the required half length of the main beam. The proof is obvious ; by similar triangles the shortening is $\frac{1}{5}$ of $\frac{1}{5}$ of the full length.

The shape of the midship section in the model barge was compared with various possible curves, and it was found that the involute of a circle was the mathematical curve which agreed best with the actual section. The involute is obtained by unwinding a cord from a circle as shown in fig. 4. The radius of this circle is 3·879 inches, or almost exactly $\frac{4}{5}$ of the half width at the gunwale. The coincidence here hardly seems to have been accidental. It agrees too well with the other proportions.

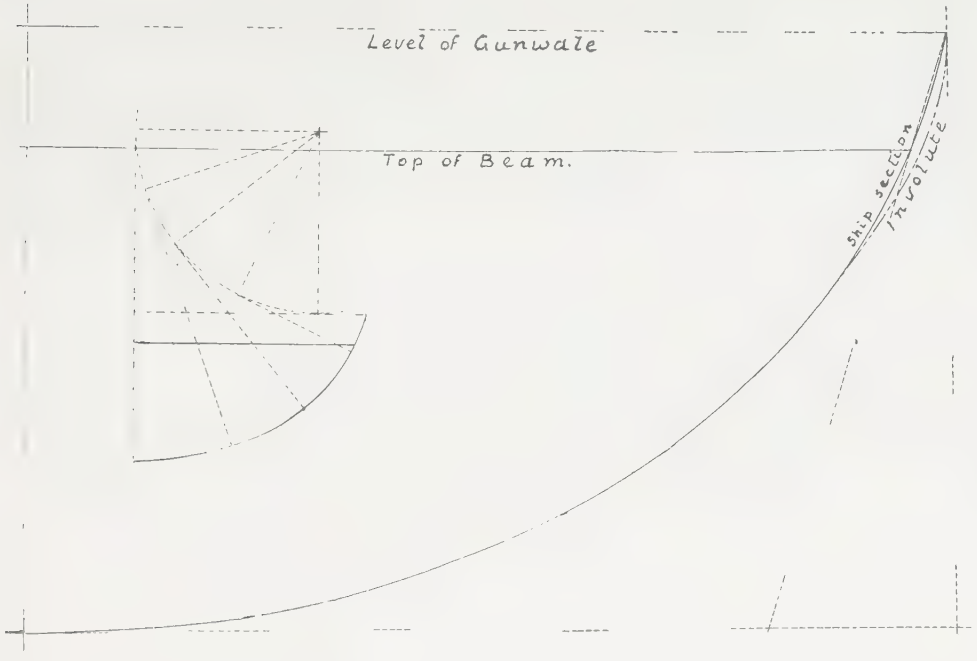

Fig. 4. Midship Section of Funerary Barge of XIIth Dynasty (Cairo Museum). Half width, 48·75 ins. Half beam, 46·75 ins. Depth : gunwale to keel, 32·1 ins. ; gunwale to top of beam, 6·5 ins. Method of drawing involute ; radius of generating circle, 38·79 ins.

In order to show how the shape of the section, as taken from the model, compares with a true involute, calculations have been made at various points, and measurements taken to correspond. The results are tabulated—

Distance of ordinate from centre line	0·00	·5686	1·140	1·7243	2·1681	2·8285	3·3887	3·9299	4·3563	4·6704	4·8153	4·875	
Calculated depth of involute below line through top of gunwale ..	3·21	3·1868	3·1147	2·9995	2·8486	2·561	2·2257	1·7369	1·2473	·785	·3851	·000	
Depth of section as measured from drawing ..	3·21	3·185	3·1	3·000	2·85	2·565	2·222	1·74	1·247	·76	·255	·000	

The agreement is remarkable, though the mathematical curve is rather fuller at the side than is the model, as is apparent in the drawing (fig. 4).

There is, however, an objection in theory to the section being an involute of a circle. The curve called for by treating the section as an arch, and assuming that the cargo was all carried on deck, is a curve which lies well inside the involute.

The length of the curve from the keel to the gunwale is calculated to be 6·351 inches, or 5·671 to the top of the beam.

How the shipbuilder arrived at the shape of the midship section can only be guessed at. It is quite certain that he did not set up a quadrant and sweep out a full-sized involute by unwrapping a cord. With a ship of any size this method would have been so clumsy as to be impracticable. He had the length of the midship beam and he knew its height above the keel. He would want to know how many planks he would have to build into each side; that is, he required the girth of his ship to the top of the beam. The gunwale was put on last, after the ship was otherwise complete. The tomb of Ti in the Vth dynasty shows this. The Beni-hasan tombs of the XIIth dynasty show that ships were built up in the middle first and extended to the ends. The designer may have drawn an involute and measured the length of the line, but this is considered improbable. He knew from experience that the girth bore a certain ratio to the length of the midship beam. In the model this ratio is $\frac{5{\cdot}671}{4{\cdot}675}$ or 1·213, say $1\frac{1}{4}$ or $\frac{5}{4}$, a proportion which seems to occur too often to be quite accidental.

Knowing the girth, the shipbuilder measured off the length on a piece of rope, and hung it between two posts, so that the bight of the rope just touched the underside of the keel. The ends of the rope would be outside the ends of the beam. He then filled the rope with planking, crossed the ends over, and screwed them up until the planking came into the ends of the beam (fig. 5).

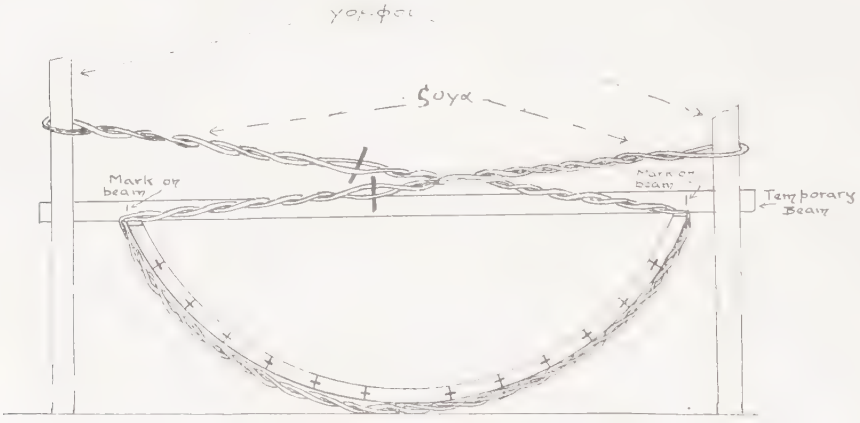

Fig. 5. Boat Building according to Herodotus.

This method agrees with Herodotus' description (see note at end). The act of twisting up the rope would cause the planking to approximate to an involute, since the tension of the rope, owing to friction, would increase according to the distance from the keel, causing the normal pressure to increase with the angle turned through, conditions which are fulfilled by an involute.

The other information the designer had to give to the ship-builder was the length of each beam and the spacing. Also he had to supply the curvature

of the keel, and the amounts the end beams were to be lifted above the centre beams.

The spacing of the beams in the model is 3·1 inches, this being increased to 3·2 inches for the end beams. There are eleven beams altogether, five on each side of the centre. Calculations were made for various curves in order to find if there was any simple curve that would fit the actual lengths. It is obvious that the half length of the beam must be used, so that the curve can be measured from a straight line along the centre of the ship.

One curve that fits fairly well is the arc of an ellipse obtained in the following way. The length of the centre beam has been found as already shown. Using the whole length of the beam as radius, draw a quadrant of a circle, divide the base into 7 equal parts, and set up ordinates. At half the radius draw a line parallel to the base, the length of each ordinate above this line is the length of the half beam. It is clear that when the ordinates are extended the curve becomes an ellipse. It will be remembered that the ordinates shown on the ostrakon were lengths above a chord of a circle.

There is another curve which gives even closer results. Draw a quadrant as before, but using the half beam as radius instead of the whole beam; divide the base into seven equal parts, and also divide the arc of the quadrant into seven parts. Join corresponding divisions; that is, join the first point on the base to the first point on the arc, the second point on the base to the second point on the arc, and so on until five lengths are obtained. Each of these lines gives the length of a half beam. These lengths have been calculated to avoid errors in drawing and the results are tabulated below—

Position of beam.	Midship.	5 or 7	4 or 8	3 or 9	2 or 10	1 or 11
Length of ½ beam as measured.. ..	for[d].	4·56	4·27	3·77	3·10	2·05
	aft.	4·53	4·22	3·80	3·12	2·12
Calculated length for ellipse	4·68	4·585	4·289	3·775	3·00	1·87
Calculated length for other curve	4·68	4·577	4·273	3·771	3·09	2·21

The second curve, which will be referred to as "the beam curve," gives remarkable agreement. The ellipse is rather fuller. The drawing (fig. 6) shows the actual curve, and also the method of obtaining the two curves. The fore end of the model is shown.

To discover a curve to suit the keel was not so easy. It is to be noted that the model is slightly unfair, in that it is visibly flattened at the position of maximum depth; it is also probable that the original ship had become distorted. In order to analyse the curve, it is necessary to work from a base line that is independent of the trim of the boat. The line that has been selected is that joining the end beams. This is one that could easily be used in practice. It was found that an elliptic arc could be drawn to fit each end of the ship; but the generating circles, from which to project the ellipses, were widely different, and the radius of neither bore any relation to the length of the midship beam. The beam curve also failed to produce any curve which agreed with the actual curve of the keel. Another method had to be tried. The distance from the top of each beam to the bottom

FIG. 6. COMPARISON OF HALF-BEAM LENGTHS WITH ELLIPTIC ARC, AND "BEAM" CURVE.

of the keel was measured and compared with the length of the corresponding half-beam. It was found that the ratio was nearly constant for the seven central beams, and decreased at the ends.

To use these depths it is necessary to know how far the top of each beam is below the line joining the end beams, that is, the sheer of the deck. The depth of each beam in the model, from the upper to the under face, is $\frac{5}{16}$ of an inch. This measurement is used as a unit.

The results obtained are shown in the table that follows.

Column *A* is the length of the half-beam as obtained from the "beam" curve. Column *B* is the ratio of depth to half-beam, the fractions being expressed in the Egyptian manner. Column *C* gives the depth from the top of the beam to the underside of the keel, obtained by multiplying *A* by *B*. The figures in brackets are the measurements taken from the model. In column *D* is shown the depth of each beam below the line. These distances as multiples of the beam thickness ($\frac{5}{16}$ inch) are shown in column *E*. The figures in brackets in column *D* are the actual measurements obtained from the drawing of the model. In making the drawing (fig. 1), a base line below the keel was used to build up the plans, but this line did not agree with the line joining the end beams—there was a difference of level of ·44 inches. Columns *F* and *G* show the designed and actual measurements, corrections for difference of level having been allowed.

	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*
	Half-beam by curve.	Fraction ratio.	Depth beam to keel.	Depth of beam below line.	No. of beam depths.	Depth of keel below line by rule.	Depth of keel below line as measured.	Error.
Fore end	2·21	$\frac{1}{2}+\frac{1}{40}$	1·160 (1·16)	0	—	1·160	1·16	0
	3·09	$\frac{1}{2}+\frac{1}{20}$	1·700 (1·77)	·3906 (·3848)	$1\frac{1}{4}$	2·0906	2·1548	− ·0642
	3·771	$\frac{1}{2}+\frac{1}{15}$	2·136 (2·17)	·7031 (·7011)	$2\frac{1}{4}$	2·8391	2·8711	− ·0320
	4·237	$\frac{1}{2}+\frac{1}{15}$	2·421 (2·41)	·8594 (·8474)	$2\frac{3}{4}$	3·2804	3·2574	+ ·0230
	4·577	$\frac{1}{2}+\frac{1}{15}$	2·593 (2·51)	·9375 (·9837)	3	3·5305	3·4937	+ ·0368
	4·68	$\frac{1}{2}+\frac{1}{15}$	2·652 (2·56)	1·0156 (1·0600)	$3\frac{1}{4}$	3·6676	3·62	+ ·0476
	4·577	$\frac{1}{2}+\frac{1}{15}$	2·593 (2·61)	1·0937 (1·0662)	$3\frac{1}{2}$	3·6867	3·6763	+ ·0104
	4·273	$\frac{1}{2}+\frac{1}{15}$	2·421 (2·48)	1·0937 (1·0226)	$3\frac{1}{2}$	3·5147	3·5026	+ ·0121
	3·771	$\frac{1}{2}+\frac{1}{15}$	2·136 (2·10)	·9375 (·9789)	3	3·0735	3·0789	− ·0054
	3·09	$\frac{1}{2}+\frac{1}{30}$	1·645 (1·64)	·5868 (·5752)	$1\frac{3}{4}$	2·2318	2·2152	+ ·0166
Aft end	2·21	$\frac{1}{2}+\frac{1}{60}$	1·141 (1·14)	0	—	1·141	1·14	0

Column *F* is, of course, the sum of *C* and *D*. Column *H* shows the error, the + sign meaning that the point obtained by rule is below the actual point. It is interesting to note that the error of ·04 at the midship section is the exact amount that requires to be added to the actual depth of the model from gunwale to keel to make the ratio of breadth to depth *exactly* 3 : 1.

The table hardly needs further comment. The fractional depth ratio is exceedingly simple. The drop of the beams below the straight line shows a constantly increasing difference from the centre to the ends. Expressed in $\frac{1}{4}$-beam thickness, the series of differences is as follows: Aft—7. 5. 2. 0. 1. 1. 1. 2. 4. 5.—forward.

Summarising these rules the process of design is quite simple. The information given was the overall length and the width at the gunwale.

Divide the width by 3; this is the depth from gunwale to keel. Set down $\frac{1}{5}$ of the depth to get top of midship beam; deduct $\frac{1}{25}$ of greatest width to get the length of the midship beam.

Take $\frac{4}{5}$ of the length of the midship beam to get the girth of planking from the top of beam to top of beam at the midship section. Use the length of the half-beam as a radius and two more spaces than exist—that is, 7 instead of 5—and draw a beam curve to get the lengths of the remaining beams. This was all the information that needed to be given to the builder.

The builder knew the spacing of his beams; he set up the two end ones at a convenient height, and stretched a cord between them. He then set down by rule so many $\frac{1}{4}$-beam thicknesses, and thus got his remaining beams. He then measured down a fraction of the length of each beam and obtained the shape of his keel. By using ropes hung up he could get his planking width and pull it in to fit his beams, the length of rope determining the amount of plank he needed for the bottom. Finally, he filled in the deck between the beams and fitted the gunwales.

As an exercise, a design for Hatshepsut's obelisk lighter was got out based on these rules. The lighter was taken as 180 cubits by 60. This gave a depth of 20 cubits. The final result compared strikingly with the Deir el Bahari carving. The total displacement with the obelisks worked out at 1,471 tons.

It may be mentioned that this proves the Egyptians to have made these carvings to scale. The size is $\frac{1}{375}$, or 1 palm equals 5 cubits. This can be checked by taking the length of the after obelisk; using this scale the length works out at 97 feet, which is known to be the length of the surviving obelisk.

In a similar way, if the scale—1 palm equals 2 cubits (or $\frac{1}{150}$)—is used for the ships of the Punt expedition, it will be found that the distance between the oar loops is 3 feet 9 inches, just a convenient space in which to work an oar.

C. D. Jarrett Bell, R.C.N.C. (retd.).

Note from Herodotus.

The key sentence is as follows:—

. . . περὶ γόμφους πυκνοὺς καὶ μακροὺς περιείρουσι τα διπήχεα ξυλα· ἐπεὰν δὲ τῷ τρόπῳ τούτῳ ναυπηγήσωνται, ζυγὰ ἐπιπολῆς τείνουσι ἀυτῶν—νομεῦσι δὲ οὐδέν χρέωνται· . . .

Translated: . . . "About stakes firm and long,[1] the two cubit planks are arranged in a curve;[2] then in this way ship construction is carried on, girths are stretched on the outside.[3] Frames are not necessary. . . ."

Comments :—

1. γομφοι were probably stout upright posts driven into the ground to give the outline of the ship. These posts supported the beams.

2. The planking was arranged to follow the curve set out by the posts.

3. ζυγὰ ἐπιπολῆς τείνουσι αὐτῶν can also be rendered "beams are laid across the top." As this would have been a common feature of Greek ships it hardly seems worthy of note by Herodotus; if ζυγὰ is taken as a strap, Herodotus seems to be trying to explain that the Egyptians hung their planks in ropes (fig. 5), as they had no framing to give the shape.

PRIMITIVE ASTRONOMY.

In modern times we are so accustomed to use instruments for observations that we hardly realise how results could be obtained before artificial means were introduced. Even in Roman times the latitude was deduced from the length of the longest day measured by a water clock. As the laws of refraction were unknown, the results of calculation gave too low a latitude; without accurate division of time, the refraction raising the sun's image could not be detected by the length of the day. No arc with degrees for angular measurements was yet invented, and the astronomy of the Egyptians, Babylonians, and Greeks deduced angles indirectly from chords, if at all.

The nearest approach anciently to angular measurement was in the concave sundial, divided into hours on its spheric surface. Hipparchus probably measured his degrees on the sky by observing subtended angles on straight scales, for Ptolemy, his successor, calculated a table of chords of angles, which would be fruitless if divided circles were in use. The divided arc of the astrolabe was a Byzantine, or, rather, Mesopotamian, invention, first described in the VIIth century; it was adopted by the Arabs and introduced into the West in the Middle Ages.

The recording of time is perhaps the most elementary matter. This was done in Egypt by cutting notches as a tally on a stick, and in Italy the years were marked by a priest driving a fresh nail into the doorpost of the temple. A late elaboration was the cutting of three rows of ten holes in a piece of wood, and shifting a peg every day of the month. The divisions of the day are marked by the Egyptian peasant of to-day by putting a stick upright in the ground, and marking where its shadow falls. It seems probable that the scientific Egyptians of the early pyramid age had used the pendulum for time division, by the cubit of land measure, 29·157 inches, swinging 100,000 times in the day.

The number of days in the year is found by the days elapsing until the sun rises again in the same direction; this is best observed at the Equinox when its position shifts nearly a degree every day. Thus the $365\frac{1}{4}$ days would be ascertained by four years' count, but the remaining error of 1/120th of a day could not be found till 120 years had elapsed. We now keep it nearly right by omitting leap year three times in every four centuries.

The moon's period, though so obvious, is not accurately found by looking for the new moon at sunset, as in the old Semitic method preserved by Islam. It would be accurately found by the lunations and days between eclipses, which was probably the Babylonian method.

The hour angle between different stars would be first found by the days that elapsed between their risings, most precisely at the equator: division by 365 would naturally lead to dividing the circle into 360°. The division of the year into lunar months would produce 12 sectors of 30°, and this led to dividing the day into 12 hours.

The days counting from new moon are readily seen in the extent of illumination of the moon, for the six grades in each quarter are easily distinguished. The hour of night can be read by estimating at what hour of day the sun would be in the position of the moon, and then adding on the hours of illumination of the disc. This counting of days after the new moon naturally led to counting the days of the waning moon before new moon, and hence the Roman numbering of days backward in the second half of the month.

The polar stars, always visible above the horizon, greatly interested the Egyptians, who prayed the sky goddess to keep their souls with the undying stars. So soon as direction was closely observed, it would be found that no star kept exactly to the same place. Thus true north would be found midway between the two extreme positions of any star near the pole.

By hanging up a high plumb line, say 10 feet, the observation would be at 15 feet distance in Egypt. A line could be observed through a narrow slit to within 1/50th inch, or 20″ of angle from the plumb line, a smaller amount than the error of any building known. I have in practice followed this method in finding the true north.

The most accurate observation of a star being on the meridian would be by a cord stretched true north and south, above a pool of water about 20 feet below; by noting the instant of the reflection of the star and cord being seen when looking past the cord, a very accurate observation could be made. There is ground for supposing that the long trenches lying north to south at the east of Khufu's pyramid were intended for such observation. These trenches were lined with large blocks of stone which would reduce the width to only a few feet.

The precessional movement of the earth's pole, deviating to different stars in the course of centuries, would need long observations to notice or ascertain. More accurate observation could be made by observing the change in the direction of stars at rising or setting; but the cycle of 25,800 years would be impressed on man by the sunrise at the equinox being in different constellations.

The size of the earth was first ascertained with fair accuracy by noting that the sun was vertical on the longest day at Aswan, but the shadow was about 7° from the vertical at Alexandria: by a happy chance, the result was much more accurate than might have been expected.

We see how much could be done in observation without any apparatus but a piece of string. The main difficulty was in measuring time, and if the early dynasties knew the pendulum the use of it was certainly lost in after ages. The different forms of water dropping or flowing, as a clepsydra, are too vague for any exact result, and this held man back from any exact knowledge or record except that of eclipses.

FLINDERS PETRIE.

A NOTE ON AN ALLEGED RESEMBLANCE BETWEEN DEFORMED SKULLS OF THE CAUCASUS REGION AND THE HEADS OF EL AMARNA.

In *Ancient Egypt and the East,* 1933, pp. 29–35, Prof. V. A. Avdief records the finding of certain artificially deformed skulls in Russia, the Caucasus, Armenia and various parts of Asia Minor, and draws attention to the supposed likeness between a skull from the Kabarda-Balkaria region, of which he gives a figure, and the heads of Akhenaten and his family, who he believes may have been subject to a similar process of distortion.

The theory of the deformation of skulls at El Amarna was proved to be false at least six years ago, but seeing that it has again been brought forward, it may be useful to recapitulate the points of the discussion that then took place.

The occasion was the finding of an artificially deformed skull of a girl by Dr. L. Gatineau in a Coptic cemetery of the Vth century A.D. at Medall, near Fachn in Upper Egypt. The skull is now exhibited in the Royal College of Surgeons, together with a wax model believed to represent the appearance of the head in life.

Dr. Gatineau passed on the skull to Dr. G. P. G. Sobhy for examination, and Dr. Sobhy's report appeared in the *Bulletin de l'Institut français d'Archéologie Orientale,* t. xiv, 1918, pp. 65–67, under the title " Déscription d'un Crâne trouvé dans une Tombe à Tel el Amarna." Photographs were appended and measurements given, and the writer recorded his opinion that the head belonged incontestibly to one of the family of Akhenaten, with the portraits of which he found it to agree.

In the *Journal of Egyptian Archaeology,* vol. IX, 1923, p. 117, a note is recorded from Dr. Sobhy stating that he had been misinformed, and that Dr. Derry had pointed out that the head was from Medall, not Amarna, and was of the Vth century A.D. Nevertheless, in 1927 [1] Mr. Warren R. Dawson revived the attribution of the skull to Amarna and made interesting deductions from it as to the heliocentric track of the custom of head-deformation, which probably originated in Egypt in the XIVth century B.C. A few weeks later [2] he acknowledged his mistake as to provenance, but adhered tentatively to the theory of the deformation custom in Egypt.

A communication then appeared from Dr. D. E. Derry [3] which would seem to put the whole question to rest. He pointed out that Dr. Gatineau's wax model which looks so like a princess of Amarna does not follow the contours of the Medall skull, and that the shape of this skull is long, narrow and high, whereas the Amarna statues and the two known skulls of the period represent wide flat heads. He further stated that among many thousands of skulls examined by him belonging to all periods, not a single case of artificial deformation of the head was found, and his conclusion is that the custom did not originate in Egypt and was never practised there. The particular skull in question is probably that of a visitor from the Caucasus.

A comparison between the skull figured in *Ancient Egypt and the East*, p. 34, and the head of an Amarna princess will show the absence of true resemblance. Skulls whose contours are to be compared must be placed in the same relative position, and for this purpose the " Frankfort plane " is almost universally adopted ; that is, the skull is so poised that a line drawn touching the upper margin of the external auditory meatus and the lower margin of the orbit is horizontal. If the Kabarda-Balkaria skull is placed in this position the dome appears even higher and more vertical, with extreme shortening of the occipital region (fig. 1), while the head of the princess (figs. 2 and 3, Berlin 21223) is wide and comparatively flat, with no diameter reduced at the expense of another—a condition which must result in artificial deformation. In short, it would be hard to find two heads more completely unlike.

Fig. 1.

Fig. 2.

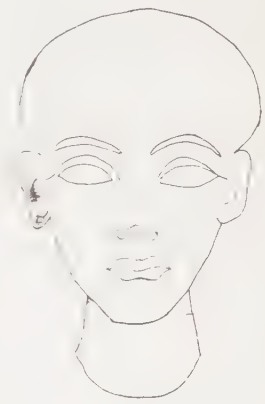

Fig. 3.

Thus we are compelled to disregard what might have been a striking piece of evidence of the connection between Ancient Egypt and the Caucasus.

Edith M. Guest.

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1. *Lancet*, Nov. 5th, 1927, p. 1001.
2. *Ib.*, Nov. 26th, 1927, p. 1166.
3. *Ib.*, Dec. 12th, 1927, p. 1376.

REVIEWS

Le "Cœur" dans les Textes Égyptiens depuis l'Ancien jusqu'à la fin du Nouvel Empire. Par Alexandre Piankoff. Geuthner, Paris, 1930, pp. 128.

The most important part of this book is the first chapter, which is a well-documented attempt to differentiate the *ib* and the *ḥ³tí*. The *ḥ³tí* seems to be "that which is in front," both as to position and importance of function. Both words appear in the Pyramid Texts, but the writer thinks, without giving any definite reasons, that *ḥ³tí* is of slightly later origin, though it continues into Coptic as ϩHT, while *ib* is lost. He believes *ḥ³tí* to indicate the physical heart, as it clearly does in the M.K. scenes of butchery; for in the P.T. the *ḥ³tí* is torn out or eaten or entrusted to Sehmet. On the other hand Horus carries the *ib* to Isis, and the deceased is given possession of his *ib*. Moreover, with the verbs *in* and *irí*, *ib* is always used, while *dí* takes both words in an apparently synonymous sense. Hence the writer's general rule that the *ḥ³tí* is physical and that *ib* is used in a metaphysical sense denoting such qualities as courage, is replete with exceptions. The two words are next studied in the Medical texts, where a similar lack of precision is found, though the author believes the same general distinction to hold. It would, however, be surprising to find precision of terms amidst so much confusion as to anatomy and physiology. The physician is said to recognize the movements of the *ḥ³tí* by feeling the blood-vessels and putting his hand on the place of the *ib*: the *mtw* carry air to the *ḥ³tí*, which therefore functions as lungs: in certain cases (p. 20) *ib* stands for stomach, and the externalized *ḥ³tí* of Bata assumes the functions of the digestive organs and absorbs water whereby it lives again. Nevertheless, the author finds himself able to state categorically that the word *ḥ³tí* is always used where the circulation of the blood is in question. In the literary and religious texts of the M.K. and N.K., *ḥ³tí* is found to be physical and *ib* figurative, but again by no means consistently. Chapter II is a study of expressions formed with the words for "heart," and these seem to cover almost the whole gamut of human emotions. As the sense is figurative, *ib* is the more frequent word, but the *ḥ³tí* also is agitated, loves, understands and rejoices. The next chapter, on the heart in religious rites, discusses the relation between the *ib*-*ḥ³tí*, *k³*, *b³*, and *ḫ*, which are found to be largely parallel. Finally, the heart in metaphysical conceptions is studied, chiefly in respect to the Memphite cosmological philosophy as redacted in the B.M. Stele No. 797, of the VIIIth century B.C., where the world is created by *νοῦς* and *λόγος*, namely, Ptah as the *ḥ³tí* and tongue of the Ennead. Thus, the precise differentiation of terms which we hoped to find escapes us from beginning to end, but the author may fairly claim to have shown that this is because it was never present in the literature as known to us, and not because that literature has not been adequately examined.

Some of the translations need revision: on p. 49 Ptah's title *rsí inb f* is rendered "celui de la muraille du sud": it should be "he who is south of his wall," in contrast to Neith who in Memphis is "she who is north of the wall", as seen in the title *ḥm ntr Nít meḥtt inb* (Mar. Mast. D. 47 and D. 55, L.D. II, 46, etc.). On page 60 *nḏ* is translated by "venger", a usage now abandoned by most scholars and certainly not indicated here. A few translations of medical terms are offered with a query, but as they are merely verbal translations of the words used, or even guesses, they lead nowhere. On p. 40 "mon cœur" for *ib k* can hardly be more than a slip of the pen, and so perhaps on p. 79 "mon

cœur" for *ib f*; but here a serious alteration of the idea results. As index there is a full list of the expressions quoted, with references. E. M. G.

Methods of Hand Spinning in Egypt and the Sudan. By GRACE M. CROWFOOT. 8vo, 51 pp., 44 pls. 1931. (Bankfield Museum Notes, Second Series, No. 12). 3*s*.

In this careful study the writer tabulates and describes six main types of spinning, from the simplest and most primitive type of hand spinning, by hand alone, to the highest type—spinning with a suspended spindle—reached before the invention of the wheel. Our knowledge of flax spinning in ancient Egypt is derived from XIIth dynasty tomb pictures and from two tomb models; these clearly show that the method used was the suspended spindle process, with preliminary treatment of the flax by the old hand method. Great skill must have been required for the simultaneous use of two spindles; and three features, all differing from classical and contemporary European practice, namely, the absence of a distaff, the use of the spindle whorl uppermost, and rotation of the spindle by rolling it on the thigh, are of very special interest because they have survived to the present day. The very careful preparation of raw material for spinning went out with the fine linen to whose excellence it contributed, and the dexterity with two spindles has vanished; but to this day the wool spinners of Egypt and the cotton spinners of the Sudan use their spindles whorl uppermost, they roll them on the thigh, and they prefer to spin without a distaff, as do the flax spinners of Egypt. L. B. E.

Anatolia through the Ages. By E. F. SCHMIDT.—The great mound of Alishar is about sixty miles north of Kaisariyeh, in the midst of Asia Minor. In 1927 the work was begun, and portions were worked out in three years. At the base there is an unknown depth of neolithic age On this is stratum I, where copper first appears. Spindle-wheel types prove a useful series to distinguish periods. Rude idols much like early Danubian products, and a copper seal with diagonal cross design, are the highest class.

To this succeeded an alien people, stratum II. Cuneiform tablets appear, like Cappadocian tablets elsewhere, of early Hittite period. Regular groups of building, large stone jars, finely-shaped pottery with high polish, weird little bronze figures, a pottery model shoe with upturned toe, Hittite seals, ornamented bone work (exactly like that of 2300 B.C. at Gaza), all show a considerable civilisation. Contemporary (and perhaps earlier) is stratum III, which is definitely Early Hittite, distinguished by painted pottery with crossing line patterns and zig-zag.

Stratum IV belongs to the Hittite Empire, contemporary with the XVIIIth dynasty. Henceforward the skulls are typically dolicho-cephalic. Hitherto hieroglyphic writing, iron, and new styles of pottery mark this period. Geometrical chequer and key fret pattern, with plants and animals, and knee fibulae are also found.

After this there is the Phrygian and Medo-Persian level with sound fibulae, and lastly the Hellenistic and Roman. F. P.

Die Totenliteratur der alten Aegypter. By KURT SETHE. 4to, 24 pp. 1931. (Berlin, Akademie der Wissenschaften.) RM.2.

In this pleasant account of the literature of the dead, Sethe traces the origin of the custom of supplying the deceased with funerary texts (on tomb walls,

coffins, and papyrus rolls) to the example of Unas, the last king of the Vth dynasty, who was the first to have the walls of the inner chamber of his pyramid carved with religious texts, probably as a precaution against neglect. The Pyramid Texts are in the third person, with frequent use of the royal cartouche, though there is evidence that the original texts were composed in the first person. The following explanations of these two paradoxes are offered: (1) the Pharaoh foresaw the violation and exposure of his sanctuary and perpetuated his name in this way; (2) the first person, though unsuitable in itself for an officiating priest, would be suitable for one who impersonated the deceased. L. B. E.

The Tomb of Queen Meryet-Amun at Thebes. By H. E. Winlock. Pp. 95, 46 pls. 1932. (Metropolitan Museum, New York.) $10.0.

This volume is a full and complete account of the excavation of a hitherto unknown royal tomb, and the author is to be congratulated on his double achievement, the actual excavation and the exhaustive record. America lags so far behind the rest of the world in the matter of publication that Mr. Winlock has earned the gratitude of all Egyptologists by producing a volume of scientific accuracy with numerous and adequate illustrations, yet at a cost which is not entirely prohibitive for the ordinary student. The publication has been made within a reasonable time after the discovery, so that the information is in the hands of scholars as quickly as possible; here again is a matter for gratitude.

The book begins with a clear description of the actual tomb, of which there are numerous plans and sections. Then follows the account of the mummy of the queen, an appendix on pp. 83–85 giving the anatomical details and measurements. It is interesting to find that the jewellery which the royal lady wore could be largely reconstructed from the impressions left by the ornaments on the bandages and soft resin, though the objects themselves had been wrenched off by robbers centuries ago. The metal of the jewels was certainly gold, and was the real objective of the thieves. The ornaments consisted of a metal fillet with floral pendants encircling the head, cuff-bracelets of gold and beads on the wrists, similar ornaments on the upper arms close to the shoulder, a large scarab over the heart, and a girdle of shell-shaped and disk beads of lapis lazuli round the waist. The coffins are fully described and illustrated, and much of the funerary furniture has been reconstituted from the fragments which were collected by the excavators with meticulous care from various parts of the tomb. The two robberies of the tomb and the restoration in the nineteenth year of Paynudem I after the second robbery have been carefully worked out, and the rebandaging of the mummy by the priests is given in full detail. An interesting point is the estimated length of time required by the restorers to clear away the disorder left by the robbers, to complete the rebandaging, and to tidy away their own things and leave the tomb, outwardly at least, in good condition; the whole work could, according to Mr. Winlock, have been done in one day.

Mr. Winlock is at his best when dealing with concrete facts; but when he tries his hand at theory the result is not so good. The reconstruction of the scene of the burial of Entiu-ny (in this name the "u" should be omitted, as the meaning is "She who is mine") is unconvincing as it stands, but when the promised volume on this intrusive burial is given to the world Mr. Winlock's reasons for his statements may be made clear. Again the chapter on the relationships of the royal ladies to the contemporary Pharaohs seems to indicate that Mr. Winlock is hampered by the feeling that the Pharaohs, like ourselves, were prevented from marriage within certain degrees of consanguinity. Unless

it is realised that Christian marriage laws are of comparatively recent origin and cannot be applied to the ancients, little progress can be made in the study of Pharaonic relationships. But these defects are not vital to the main import of the volume, which is one of the most valuable records of Egyptian excavation which has appeared in recent years.

M. A. Murray.

Excavations at Chandravalli. By M. H. Krishna.

This is a most promising opening of scientific research by Indian initiative, due to Mr. Krishna, whose studies in London will be remembered by many. He opens by stating how such research has been neglected in South India, until now, happily, the Mysore Government has advanced the subject in the University of Mysore. The present output is a widely planned piece of work, by sinking search pits and carefully noting results. In one site five floor levels were found, each dated by native coins; the lowest but one had a denarius of Augustus, while below that was a level with iron slag and polished pottery, red with white ornament. Three dozen samples were taken in different parts of this district, each here described. Such work, if carried on with fuller resources, would soon clear up the history of civilization in India. F.P.

Antiquités Egyptiennes du Musée de Vienne, Isère. By A. Varille. 8vo, 18 pp., 4 pls. 1932. (Geuthner.) Frs. 10.

This account begins with a broken stele of Ramessu-em-per-Ra, and a copy of the stele when complete, before 1870. There is also another stele of him at Lyons adoring Hathor. The stele C77 Louvre is of the same type. The same man is known by a stele from Gurob, a stele in the Villa Albani, one from Abydos (*Mariette*, Abydos, II, 50). He was a Syrian, Ban-Matzana of Zerbasana.

There are also described here a canopic jar of Neb-Amen, another nameless, a stone vase and two of pottery from El Khozan, four illegible shauabti, a jackal and a falcon of wood, a mummy named Hor-sa-Asit, two fragments and three animal mummies, two Coptic textile fragments, and two recent vases.

F. P.

Atlas zur Altaegyptischen Kulturgeschichte. Part II. By Walter Wreszinski. Sheets (photographs with key-drawings and appended text). 1932. (Hinrichs, Leipzig.) Reichsmarks.

The appearance of the second part of Professor Wreszinski's *Atlas* marks not only the completion of another stage in this immense undertaking but also an important internal advance on Part I. The photographs are better, the line drawings more numerous and much more accurate, and the text has gained in mastery of the detail involved. It is now easy to set aside one's predilections for a different treatment of the material and to be heartily grateful for the mass of pictorial records which it places in our hands, the guide which it gives to their interpretation, and the hints at what is most valuable in them for historical and cultural research.

In a sense this publication is a temporary makeshift. Most of this material merits, and will some day receive, more elaborate editing. But it is the case of a ninety-nine years lease; the day when the last of the temples of Egypt will have received this attention, though not so far off as the Greek Kalends, is beyond all practical consideration. Nevertheless the near future ought to see the definitive edition of Medinet Habu, and, in my opinion, we might have been spared the purchase in duplicate of this extensive material. No doubt the extra-Egyptological world is being catered for. But who pays the piper ought to call

the tune. We would urge Professor Wreszinski to give strong preference in his future selections to such pictures as are unavailable in any creditable form and likely to remain so for some time. The subjects which are most easily secured are generally those of which we are least in need.

The line drawings, though necessarily often in miniature, allow a rapid survey of the contents of each plate. Where the photographs are too indistinct to serve as a corrective, a careful comparison with trustworthy copies shows that they now reach a commendable degree of exactitude. It is very satisfactory to find that the photographs show no retouching. Manipulated photographs are not to be wholly condemned; but, in that case, they ought to be characterized as such on the plate itself, for they then fall into a totally different evidential class. Part II deals almost entirely with battle scenes, or the commemoration of military expeditions, and thus presents us with innumerable depictions of the native and mercenary troops of Egypt and of the combatants they met with on foreign soil. It is an enormous gain that the textual commentary on these scenes from various temples and different periods should come from the hand of one man, and he by this time familiar, as none other is, with all the repetitions and all the variations of this particular group of records. Each picture is thus brought into relation with all the others of its kind, and the succinct descriptive text attached to each is worthy therefore of the most serious attention. Even if the author should prove to have some recurring misjudgment, it would be easily eliminated and would not affect the whole. We have thus here all the data for a more difficult study, for which there is no place in this work—the appraisement of the historical and representational value of these battle-scenes.

We need not seriously cavil at so large a part of a *Kulturgeschichte* being occupied by the depiction of brutal and braggart warfare. The foreign wars of Egypt were a unifying force in lands in which the main strength of barbarism lay in the total aversion of the parcelled-out peoples to permanent cohesion and their exposure to continual internecine strife. They could be converted to quietness and higher social standards only at the point of a resistless sword. The effect of conquest was so far a civilizing one, without there being any missionary impulse. That these peoples "did not know Rê" was Egypt's excuse for enforcing servitude, not her incentive. The proportion of mercenary troops in the Egyptian army, no less than the poverty of spirit which the paeans of victory exhibit, leaves us with a low estimate of the national ideals. Those who to-day condemn war as wholly insensate and futile take very short views, both backward and forward. Such tirades against natural impulses of mankind, and scorn of the "somehow good" in which they are apt to end, might stutter a little at the discovery that the greatest result of the invasions of Syria by Egypt was that, in the backwaters created by this swirl, the hunger-stricken Hebrew clans crept up, bringing out of the level and unsoiled desert that fierce monotheism which thrives best there, and which in this case had such vitality that it leavened the entire world.

The recoil of these wars upon the Egyptian nation was far from being as salutary as one might have hoped. Gains won by force are apt to be looked on with the gloating eye of a robber, not with the teachable admiration of an equal. Egypt gained immediately the chariot, new weapons, improved military organisation and strategy; but not the ardour to use them, still less the wit to apply the lessons to civil uses. Chariots, for instance, invited road-making, but did not bring it about; though swift communications up and down the valley of the Nile might have warded off disunion and invasion. The looting of

Lotnu seems to have resulted mainly in luxury, emasculation, and mental unrest; for wealth that comes easily is usually squandered, rarely invested in national securities. At any rate, the favourable influences of success did not preponderate or prove lasting. The East was enabled to take a delayed revenge in blow upon blow; even the beneficent forces of Christianity were perverted in crossing the frontier.

However exact or inexact such an estimate may be, these pictures of war ought to lead us through military and ethnical studies to deeper questions of historical tendency and development. The scenes are, of course, very one-sided. Egypt Abroad in Part II is rightly placed after Egypt at Home in Part I of the *Atlas*, where soldiery has such a restricted rôle among the rural occupations, the crafts, the amusements, the domestic life of thoroughly Egyptian Egypt.

N. DE G. D

The Oriental Institute. By J. H. BREASTED. 8vo, 455 pp., 2 pls., 207 figs. 1933. (University of Chicago and Cambridge University Press.) 22*s*.

This volume outlines the prodigious scheme of research in the East planned and started by Prof. Breasted. It is written with a view to instructing the American public as to the meaning, the means, and the purposes of these new developments.

The organization occupies a quarter of the book, the Egyptian work one quarter, the Asiatic work over another quarter, and the remainder is on the publication department. Here we can only note the expeditions.

In Egypt there is first the prehistoric survey, which grew on the British School work by Dr. Sandford, and has cleared up the general course of that age. At Memphis some years of work are planned on copying the early mastabas. In the Cairo Museum a large enterprise of copying and publishing all the magical texts on early coffins has been brought to the final stage of planning the publication. At Medinet Habu the architectural survey has been active in the clearing of the temple and copying especially the great naval battle scenes of European importance; the great volumes of this work are one of the most splendid but reasonable issues of editing. The Abydos expedition has also undertaken a great task in copying the temple of Sety.

In Asia, the Megiddo expedition is the largest and most complete scheme yet started. The intention is to remove the whole mound, one stratum at a time, and completely record and publish the results. Eight years have not sufficed to produce a volume; it reminds one of a mediaeval knight so completely armed that he cannot mount his horse. The perfect elaboration of method is marvellous, and the publication will set a standard which will be the despair of light-armed enterprises. The great stables of Solomon and the immense shaft and tunnel for the ancient water supply are the most spectacular results.

In Asia Minor the Anatolian-Hittite expedition has been active. The survey in detail is begun, and the great city of king Anita, the first Hittite king yet known, is being excavated 30 feet deep at Alishar, 130 miles east of Ankara. Three stages are recognised, pre-Hittite, Hittite and Phrygian. Another great city, Chatal Huyuk, near the Orontes, is also being explored.

Persia is an immense field of early civilisations, which may well prove to be the earliest region of all. Persepolis is the main centre now, and great results are reached of the age of the well-known kings. But near it a neolithic town with well preserved houses has been opened, having painted pottery preceding the earliest of Susa, following which come the periods of Al Ubaid, Uruk and Jemdet Nasr. So a series of cultures is now seen, long before what was supposed

to be the beginning. A series of sites linking this earliest age with that of Persepolis is now being prospected for future work. At Persepolis the large lay-out of the harem buildings at the side of the palace proved to be in such preservation that it has been roofed in and is the headquarters of the American work. Beneath the palace is found a large system of drainage passages for the rainfall. The grand sculptures of Cyrus have already been widely published in England.

In Iraq two sites have been chosen, east of Baghdad : Tell Asmar, the ancient Eshnunna, which is the headquarters, and Khafaje. At Tell Asmar the record of kings during three centuries before Khammurabi have been recovered. At the bottom, 20 feet down, is the earliest complete lay-out of a palace. In the level of the last king of Sargon's dynasty was found an Indian cylinder seal with figures of elephants, about 2500 B.C. Khafaje was a site worn away by denudation, exposing on the surface a town of 3000 B.C., a great square temple enclosure and buildings around it, surrounded by a ring of earthwork. Three priestly statuettes of copper were found here.

In Assyria, Khorsabad is far from exhausted, inscriptions lie close to the surface. Near Kirkuk a little mound yielded over a thousand tablets, the archives of six generations of a family, belonging to a civilisation as yet unknown. Further work was done at Khorsabad, and a complete stone bridge of Sennacherib has been discovered.

The multitude of tablets found demand an advance in the language. A general dictionary of Assyrian has been in progress since 1921, embodying on cards every occurrence of each word, a concordance of all Assyrian documents. This is carried out in transliteration, not needing the original writing like the Egyptian dictionary. It serves also as a base of study on separate subjects, under the chief words. For the history of persons, or identification of places, the collection is indispensable. Other linguistic enterprises are dictionaries of Old Persian, Aramaic and Phoenician. The complexity of Sumerian is being examined in view of compiling a dictionary. It is hoped to master the Assyrian material on $2\frac{1}{2}$ million cards, in the next five years.

A vision which is gradually growing is the complete corpus of all archaeological information, with figures of every object. Here the difficulty will be the overwhelming bulk, which must be concentrated in order to be available practically. A corpus of type forms is the only possible scope, and that already runs to hundreds of forms of pottery in each period of each country.

A great amount of publication of texts, Egyptian, Assyrian, Hittite, Syrian, etc., is already getting under weigh. Altogether we see here one of the greatest enterprises for studying the past of man that has ever been organised. The opening up of the civilisations of the East has become as important a subject for teaching as the opening up of physical science on a large scale in the last two generations, and it demands equal attention and provision for study. F. P.

Tell Halaf. By Baron Max von Oppenheim. Translated by Charles Wheeler. 8vo, 336 pp., 68 pls. 1933. (Putnam's.) 21*s.*

This site is near Ras el Ain on the Baghdad railway, 200 miles east of Issus. The Tell is considered to have been the capital city of Subartu, occupied from 3100 to 2600 B.C. by a people who built with wall sculptures of the same class as those of Sinjerli and Sakje-Geuzi, but less finished. After that age there was, about 1150 B.C., much building by an Aramaic king Kapara, using the old material.

The sculpture is crude and cubist in nature, especially on the statues. In the lowest levels there is much painted pottery, of eastern rather than western connection : none of the kinds imported at Gaza are figured. There were chariot models of pottery, with spokes painted on the wheels.

The best of the statues are of a seated goddess holding a bowl. This seems to be the prototype of similar figures which are numerous in Southern Russia. The winged sphinx figures are like those from Sinjerli, in the palace of Barrekub, 730 B.C. This suggests that the sphinx portal guards at Halaf were a much later addition to the original building, the statues in which are far cruder and less detailed. The mingling together in one stage (p. 258) of such figures of decadent detail with the bold work of the colossal bird, brings some doubt of the classification by style.

A few graves were found, which contained distinctive ornaments. The sacred tree between animals recurs in gold work, and a weird mouth-covering of gold with stripes of blue and white enamel for the hair on the lips. If this be enamel, and not inlay, it would be a very early example. Earrings are of the triple boss type, as on the royal attendants at Khorsabad. For a popular book this is well illustrated and detailed; it is, however, "the forerunner of a definitive scientific work." F. P.

The Tomb of Nefer-hotep at Thebes. By NORMAN DE GARIS DAVIES, with plates in colour by NINA DE GARIS DAVIES. In two volumes, pp. 81, pls. lxi+vii. 1933. (New York.) Price $25.

When a publication is issued in the joint names of Mr. and Mrs. de Garis Davies it is a guarantee of accuracy in the reproduction of the sculptures and sympathy in the explanation of the scenes. The tomb of Nefer-hotep is one of the most interesting of the series that the Metropolitan Museum of New York is now publishing. The interest lies not merely in the scenes of daily life, but in the art itself. Mr. Davies claims that there is seen here the last flicker of the art of El Amarna, though in the main the artists had returned to the old methods and conventions. It is only to be expected that some of the art would survive to this date if Mr. Davies is right in his reading of the King's cartouche as the "Divine Father, Ay," the immediate successor of Tut-ankh-Amen. Hay, who copied the tomb more than a century ago, read the cartouche as that of Amenhotep I, but he was doubtless influenced by finding the name of that king in the scene of the worship of him as ruler of the necropolis.

It was an inspiration on the part of Mr. Davies to reproduce the copies, made by Hay and Wilkinson, of the scenes in the tomb. The scene of the king and queen in the balcony with courtiers below is an example of how even a careful copyist like Hay could be misled by not realising that a later artist had altered the original drawing. Much of the sculpture had been overlaid with plaster in Ramesside times, and the lower parts of the two royal figures had been drawn in over the plaster by an ignorant draughtsman without regard to anatomy or proportion. Hay copied what he saw and therefore preserved the upper parts of the figures which are now almost entirely destroyed; Mr. Davies has removed the plaster and has revealed the whole of the original picture. In the case of the weaving scene it is only necessary to compare Wilkinson's drawing (pl. lx. C) with what remains at the present day (pl. xlix) to see how much the careful copyists of the last century have preserved.

Mr. Davies's discussion of the *shadûf* is interesting, but unfortunately leads nowhere. The machine was certainly in use in the New Kingdom, as pictorial

representation proves. That no name for it has been recognised in the language is not in itself evidence of its foreign origin; rather the reverse, for foreign objects usually bring a name with them. I suggest, as the root *šd* has the meaning of to bring away, to take out, especially with the idea of "in a container," and as the derivative *šdw* is a waterskin, that the word *Shadûf* (*šdwf*) is ancient and is either a form with suffixed masculine pronoun, as in Coptic, or the *w* has changed to *f* in pronunciation. Mr. Davies is undoubtedly correct in suggesting that the *shadûf* was rarely used, probably only in the private gardens of the wealthy; this would be the reason why the name does not occur and that the language was not enriched with similes and references to its use.

The book is full of interesting and suggestive material for the student, and Mr. Davies's explanatory commentary is extraordinarily helpful. There are, however, one or two faults. In his desire for dramatic description Mr. Davies has allowed himself to be led into some inaccuracies; there is, for instance, nothing to show that the overseer's servants "armed with clubs and a noose, lasso the unfortunate herdsmen as if they were so many cattle and drag them up for discipline." There is nothing in the scene to warrant the idea of lassoing, and even the dragging with ropes is doubtful. The figure of the supposedly lassoed man does not appear to be part of the original scene, as it is squeezed into a place where it does not belong, and overlaps the figure in front and the figure behind.

The translations of the inscriptions are purposely free in order to give the dramatic effect. This is a good innovation, for it gives the human touch so often wanting in translations from the Egyptian. There are a few mistakes, *e.g.*, on pl. lii Meryt-Re is called "his beloved sister," but the translation gives "his beloved wife." Mr. Davies has also not realised that the marriage laws of ancient Egypt did not conform to our present standard, and that when Ahmose Nefret-iry is called "King's mother and King's wife," the words are to be taken literally as indicating her relationship to the King with whom she is represented. But Mr. Davies's chief fault is a use of pedantic expressions, such as "libated" and "depicted."

All these, however, are but small faults, the shadows which enhance the brilliance of the whole achievement. M. A. Murray.

JOURNALS

PUBLICATIONS DE LA SOCIÉTÉ ÉGYPTOLOGIQUE À L'UNIVERSITÉ DE LENINGRAD, 6. 1930.

The first four pages and page 9 of this publication of 44 pages and two plates are in Russian, the rest in German.

PIOTROVSKIJ, BORIS.—*Zur Revision der Verteilung des Wortschatzes im ägyptischen Wörterbuch.*—The writer demands a revision of the distribution of the words in the Egyptian dictionary according to semantic complexes.

FLITTNER, N.—*Ein Alabastergefäss aus Haremhebs Zeit.*—This is a description of an alabaster vase in the Hermitage with the name of Horemheb on it. It was bought in Egypt about five years ago.

STRUVE, W.—*Die Scheiberpalette* [sic] *No. 2372 der Ermitage-Sammlung.*—In describing this palette in his *Inventaire de la collection égyptienne*, 1891, Golenischeff remarked that the back of the palette contains a very indistinct hieratic inscription. The present writer gives a transcription of this inscription, which concerns deliveries of grain.

JERNSTEDT, P.—*Die koptischen Papyri des Asiatischen Museums.*—The small collection of Coptic papyri which are edited in this article was acquired by the Asiatic Museum in 1926 from B. Turajev's collection. L. B. E.

Vorläufiger Bericht über die Deutsche Hermopolis-Expedition, 1929–1930. By Dr. GÜNTHER ROEDER. 4to, 57 pp., 19 pls. Reprinted from *Mitteilungen des Deutschen Instituts für ägyptische Altertumskunde in Kairo*, Vol. II, Part 2 (Augsburg, 1931).

This is a preliminary report on the first German excavation in Egypt since the war. The object of the expedition was to dig the site of a town that had arisen gradually. As no German field-Egyptologist was to be had, Dr. Roeder obtained the necessary assistance from two fellow-countrymen, of whom one had worked with the Koldewey School in Mesopotamia, the other on prehistoric settlements in Germany. In his summary of results, Dr. Roeder expresses satisfaction with the method used. No objects of outstanding importance were found, such as had previously come from the site. It was ascertained, *inter alia*, that the Bronze Age inhabitants were still using flint implements; that pottery imported from Greece was copied locally in a coarser technique, and that the town could rival important Roman cities in its architecture, thanks to the work of Greek sculptors. Further work cannot be expected to yield complete foundations of individual buildings nor their full equipment, as at sites that were only inhabited for a short period or have been buried by sand. But the lay-out of the Greco-Roman town may be elucidated with the help of a very full literary tradition, the streets and open spaces of earlier periods may be identified, and in certain favourable parts the residential quarters of the N.K. and M.K. may be reached. L. B. E.

ZEITSCHRIFT FÜR AEGYPTISCHE SPRACHE, LXVIII. PART 1. 1932.

SCHÄFER, HEINRICH.—*Die Ausdeutung der Spiegelplatte als Sonnenscheibe.*—In two hand-mirrors of the Middle Kingdom from Nubia, the handle in each case is formed of two lions; these objects take the picture of the sun rising between two lions back to M.K. date. The mirror itself cannot have been regarded as the sun before the Pyramid Age, when round mirrors first came in.

Glanville, S. R. K.—*Records of a Royal Dockyard of the Time of Tuthmosis III: Papyrus British Museum* 10056.—This is the second part of an article, of which the first appeared in *Zeitschrift*, LXVI, 2, 1931 (*A.E.*, 1932, 4, p. 122). Apart from a number of isolated historical and linguistic points, the main interest of the papyrus consists in its contribution to our knowledge of ancient Egyptian shipbuilding. The majority of the ships for which timber is used in this papyrus are called *imw*, and whatever the meaning of the word may be here, a definite type of vessel or simply "a ship," it is certain that the boats referred to had been known in Egypt for centuries and were of the type commonly represented on the monuments. A passage on shipbuilding from Pap. Anastasi IV is included, also a photograph and translation of the text of Stela B.M. 1332, which was made for one, Inena, "Chief craftsman of the shipwrights of the boats of all the gods of Upper and Lower Egypt."

Clère, J. J.—*Un fragment de stèle du début du Nouvel Empire* (*Berlin* 22485).—The headdress of one of the women is peculiar, consisting of a flat oval pad and a uraeus, of which the tail hangs down behind. There is a similar uraeus above the woman's head in the word sign for *mes* in the lady's name, and also in another name on the stela.

Wilson, John A.—*Ancient text corrections at Medinet Habu.*—There were many errors to correct in the inscriptions on the walls of the XXth dynasty temple of Medinet Habu, and the correction was not thorough and consistent. It is not at all certain that the temple when finished contained all the errors that are now to be seen, for where the plaster has fallen away the original mistake may be revealed, and not the correction.

Wilson, John A.—*The Descendants of ḥwny-r-ḥr.*—This word meaning "face-to-face encounter, first onslaught, sudden attack" is traced through various forms to a feminine noun in Achmimic ϩⲙⲱⲱϩⲉ, ϩⲙⲱϩⲉ, ϩⲙⲟϩⲉ, meaning "fear"; a genealogy is suggested.

Bissing, Fr. W. v.—*Opfertafel aus dem Grabe des Chawey-ḥeb im Museum Scheurleer.*—A new reading is suggested for the name of the person for whom this offering tablet was made.

Schmidt, Carl.—*Das Kloster des Apa Mena.*—A Berlin papyrus (P. 11937) is an agreement between the new head of the monastery of Apa Mena and the brethren. The writer of the article dates it to the 8th-9th century. It shows the depths to which the priesthood had sunk, as the new superior could not write and had to sign by three crosses; moreover he had bought the dignity for 53 ὁλοκόττινοι. This monastery is mentioned on an ostracon (*Zeitschrift* LXVII, p. 102 f.; *A.E.*, 1933, p. 62); its locality is discussed.

Miscellanea.

Schäfer, Heinrich.—*Skarabaus und Mondscheibe.*—Scarab beetles holding moon-discs are known from Tutankhamen's ornaments; the discs are definitely moons, as the circle is embraced by the crescent; and they are made of gold and silver, whilst the suns are of gold and copper. But silver mirrors (see the writer's article above on mirrors) cannot refer to the moon as the crescent is absent.

Bissing, Fr. W. v.—*Grundsteinbeigaben Sesostris' I aus dem Tempel von Dendere?*—It is suggested that an inscribed tile in the writer's collection and a bronze *situla* in the Berlin Museum bearing the name of Amenemhat I are both foundation deposits.

Capart, Jean.—*Ein vorgeschichtlicher Elfenbeinstab?*—An ivory published by Borchardt in *Zeitschrift*, LXVI (*A.E.*, 1932, p. 119) and also dealt with by Scharff in the same journal (*A.E.*, 1932, p. 122) is not considered genuine by Capart.

Pieper, M.—*Das Schatzhaus des Rhampsinit bei Shakespeare?*—It is suggested that a passage in *Twelfth Night* (Act V, sc. 1, 11, 120–22) mentioning "the Egyptian thief" is an allusion to Herodotus' story of the Treasury of Rhampsinitus.

Wolf, Walther.—*Zu Pap. Harris* 500, *v.* VI, 2.—Sense can be made of this passage in the Story of the Doomed Prince (which contains the hero's remark on the attempt of the Syrian princes to climb to the window of the princess of Naharina) by translating *šny* as "hurt" and reading, "O, if only my feet did not hurt, I would go climbing with you." L. B. E.

Zeitschrift für Aegyptische Sprache. LXVIII. Part 2. 1932.

Borchardt, Ludwig.—*Ein Brot.*—The writer has succeeded in baking a loaf shaped like a specimen in the Egyptian Department of the Berlin State Museum (Inv. No. 22847), which is deeply hollowed out in the centre. This kind of loaf was often depicted, sometimes with more than one cavity. Borchardt concludes that these holes served as bowls for the food that was eaten with the bread.

Grüss, Johannes.—*Untersuchung von Broten aus der Ägyptischen Sammlung der Staatlichen Museen zu Berlin*—The Egyptian loaf mentioned in the preceding article and four others in the same Collection were examined by the writer of this article for material and process of baking. All were made of emmer-wheat.

Schäfer, Heinrich.—*Das Simonsche Holzköpfchen der Königin Teje.*—Some recent observations of the portrait head of Queen Tyi in wood (Berlin Museum 21834) are given in detail, though the reason for covering the costly inner head-dress with a linen wig and glass beads remains unsolved. The Röntgen rays revealed the presence of the right earring under the wig.

Hermann, Alfred.—*Das Motiv der Ente mit zurückgewendetem Kopfe im ägyptischen Kunstgewerbe.*—A description is given of a gold chain in the Berlin Museum (No. 20786) composed of twenty identical pieces in the shape of a duck with its head turned over its back. The writer then reviews the various uses and modifications of this motive by the Egyptians in applied art of the N.K.

Johansen, P.—*Porträts in der ägyptischen Kunst?*—In the writer's opinion there can be no doubt that the Egyptian sculptor strove after portraiture, though he had to rely on a quick eye and a retentive memory, particularly in royal likenesses. The differences in various statues of the same person are explained by the circumstances in which the artist worked.

Corten, R.—*Ein Relief aus der Zeit zwischen Altem und Mittlerem Reich.*—On this relief, which is in the Hamburg Museum of Ethnology, the owner is apparently depicted twice, once seated and once standing before the offering table. The staff held by the standing figure is remarkable.

v. Bissing, Fr. W.—*Eine Affengruppe des Mantimehe aus Theben.*—A description of the XXVth dynasty group of three monkeys in the Scheurleer Museum at The Hague.

Hilzheimer, Max.—*Zur geographischer Lokalisierung von Punt.*—It is generally accepted that Punt was situated on the African coast of the Red Sea. A zoological clue to a nearer localization is afforded by the evidence that Hatshepsut's expedition to Punt brought back Hamadryad or Arabian baboons and giraffes. This baboon is not found farther south or farther east than Deir Dauah (in Abyssinia), whilst a species of giraffe (*Giraffa reticulata de Winton*) is known not far east of this place in the neighbourhood of Djig-Djiga, both not more than two days' journey from the coast, on which are situated the two most important ports, Dschibuti and Berbera.

Proskauer, Felix.—*Zur Pathologie der Amarnazeit.*—The writer diagnoses rickets in Akhenaton's family and attributes their characteristic dolichocephaly to this disease.

Keimer, L.—*Die "Papyrus-farbene" Heuschrecke.*—A description of green amulets in the form of a grasshopper, which the writer dates to the first half of the XVIIIth dynasty.

Till, Walter.—*Der Murmelvokal.*—The writer disagrees with the view that the horizontal stroke over a consonant or consonants in Coptic means that the consonant or consonants thus marked formed a syllable without a vowel.

Miscellany.

There is only one article under this heading, namely, a reply by O. Neugebaur, entitled *Nochmals die Scheffelteile,* to Vogel's criticisms in *Zeitschrift* LXVI of the writer's article on the same subject—the *ḥekat* and its divisions—in *Zeitschrift* LXV. L. B. E.

Archiv. für Orientforschung. VIII, 6.

Birger Pering.—*The flying disc in Assyria.*—This symbol is first met as a flying boat of the sun in the first dynasty, and on the winged disc with Khufu, though in this paper it is only quoted as from the Middle Kingdom. On cylinders it may be as early, and it is frequent in Hittite scenes. In Assyria it was surcharged with a figure of the god shooting, and it was often represented in Persia. This paper discusses it fully.

Bossert, H. T.—*The Hittite Pantheon.*—This is a discussion of the gods figured as on a panther, Khepatu and the rain-god Dadamimash. The various examples of the names in Hittite signs are discussed.

The American reports of exploration in Anatolia are reviewed, with figures of the pottery, which has affinities with Cypriote but not with Syrian forms. The Beth-shan results of Byzantine and Arab date are noticed. In the news is announced the list of kings from Khorsabad, which is complete for three thousand years and should clear up Babylonian as well as Assyrian history. Other recent discoveries have already been noticed here.

At the end is a charming biography of Sayce, with an excellent portrait. Dr. Langdon well recounts his active enterprise in new fields, where he was the greatest path-finder. It was more form than sound which attracted him, and he had an immense memory for material shapes. His zeal for discovery was boundless, but a subject already worked lost its interest. To his friends of half a century he will always be affectionately remembered as one of the central figures in life. F.P.

Quarterly of Dept. of Antiquities, Palestine. III, 2. (Milford.) 5*s*.

Avi-Yonah, M.—*Mosaic Pavements.*—This concludes the list of 362 sites. A general summary is added, classing the nature of the sites, material, patterns, etc. The few dates are all between 516 and 601 A.D., probably due to a fashion of dating at that period, rather than to absence of earlier work. Sixteen photographs show selected portions.

Hamilton, R. W.—*Tell Abu Hawam.*—This is close to Haifa, and of the Late Bronze to Roman period. Cypriote and Mykenaean sherds are the earliest. A plan with five successive periods of building, coloured, shows scarcely a trace of continuity in the lines of walling. The pottery figured is from about 1450 to 650 B.C.

Iliffe, J. H.—*A tomb at El Bassa*, A.D. 396.—This is near Ras Na-Qura, the northern frontier. The coins give approximate dates, and fix the period of 15 types of lamps. The gold earrings have a triangle of globules and a dangle of chain. The gold *solidus* of Valens has an unusually good portrait, to the credit of the Antioch mint.

Avi-Yonah, M.—*Byzantine church at Suhmata.*—The Mosaic pavement is dated A.D. 555, and is fully discussed with many photographs.

Iliffe, J. H.—*Terracotta statuette of Aphrodite.*—This is about 300 B.C., found in the well-known prehistoric cave in Mt. Carmel. It is signed on the back by Paionias. The goddess stands with the right arm raised high, a collar of painted pendants at the neck, a climbing serpent clasp on the thigh, and a plain anklet. It suggests that the cave may have had a Hellenistic shrine of Aphrodite. F.P.

Morgenland, 23, 1932.

Wreszinski, Walter.—*Löwenjagd im alten Aegypten.*—Until the N.K. lions had been a terror: they are shown seizing their prey at will and, if hunted at all, pursued on foot with arrows and trapped. With the beginning of the N.K. a new series of representations made its appearance, namely, battle scenes and hunting scenes with the lord in his chariot, inspired by the campaigns of the Pharaohs in Syria and by the foundation of a colonial empire in Nearer Asia. The motive of the lord in his chariot was common property among the peoples of the E. Mediterranean shores from the middle of the 2nd millenium. Lion-hunting now became a royal sport. In Tutankhamen's hunts the tradition of the invincibility and immunity of the king prevented a realistic rendering, but with Rameses III the element of danger is introduced, in that the Pharaoh has to defend himself from attack from the rear. Mesopotamian influence is observable in pictures of the king on foot in single combat with a lion, but there is no Mesopotamian prototype for the chariot-hunt motive, and it is possible that this motive was introduced from Egypt into Nearer Asia. L. B. E.

Palestine Exploration Fund. Quarterly. October, 1932.

Crowfoot, G. M.—*Pots, ancient and modern.*—This is an interesting comparison of old and new forms and methods. The mixture of calcite or limestone with the clay is still in use. Burnishing is now done with a shell; the ancient method is unknown. Such studies are enlightening.

Chitty, D. J.—*Monastery of St. Euthymius.*—This is in the desert south of the road from Jerusalem to Jericho. It has been thoroughly examined and planned. There were several periods of construction, in which earlier material and sculpture was broken up and relaid. The history is traced in records from

425 till Salah-ed-din. Mosaics are found of a rather crude style, but are not here illustrated.

NAISH, J.P.— *Tell en Nasbeh.*—This site, seven miles north of Jerusalem, was excavated in 1926–9 by Dr. Badé. The outer wall is of Middle Bronze Age, *i.e.*, Hyksos time. This was damaged, and Israelite walls built upon it. A temple of Ashtoreth belonged to the early monarchy 900–700 B.C., and the site continued in use till Roman times.

NARKISS, M.—*Dioscuri cult in Sebastiya.*—This is implied by a sculpture of a cap surmounted by a star. The Dioscuri also are figured together on Roman coins of Aelia (Jerusalem) and Askalon.

MYRES, J. L.—*Gog and the danger from the north in Ezekiel.*—A study of the political changes in the time of Ezekiel brings out the danger of the Scythian and Kimmerian raids. The peoples of Asia Minor are named, and it is proposed that Gog is Gyges of Lydia ; it is suggested that the " battle of the eclipse " was due to the Greeks expecting the eclipse by the prediction of Thales, while the Medes were in consternation and thus easily conquered.

CLOSE, C. F.—*Map of excavated sites in Palestine.*—This is on a large scale, inch to 10 miles, and has the references to excavators recorded at the sites, forming a useful key to researches.

Archaeology of Palestine and the Bible, by Prof. Albright, is reviewed at length by Prof. Garstang. This competent work, which is based on the facts of the land, is outspoken in dealing with the imaginations of critics. The varied researches are outlined, and a full account given of Prof. Albright's excavation at Tell Beit Mirsim, Kiriath Sepher. F.P.

ASSOC. INTERNAT. STUDI MEDITERRANEI. III. 3.

This number gives an account of the " cave of the Sibyl " at Cumae. It is a long tunnel with converging sides and a narrow flat roof, having side openings at intervals to cisterns. The varying levels of this volcanic coast may well have flooded chambers which were dry originally, and the appearance of it is strikingly like the long gallery opening on the stone chambers at Tiryns. Is it not the substructure of a great Mykenaean fort on the hill above ? F.P.

Metropolitan Museum. Egyptian Expedition, 1931–2. New York. 1933.

Mr. Lansing gives account of the work at Lisht. The pyramid pavement was searched for the chance of royal burials. The quarry marks are of years 11 to 13 of Senusert I. Foundation deposits were found under the corners of the pyramid, and many globular water pots in another deposit hole. In one place there was a hollow filled with sand over 20 feet deep. A tomb-shaft lined with brick had been sunk through the loose sand by means of a lime-stone block frame which was lowered by taking the sand out below while bricks were added *below* the lining to continue it downward. In a rubbish pit used by the priests of the pyramid there were sealings as late as Sebek-hetep III, showing the continuance of the funerary service. In a low cliff south of the north pyramid small tombs were found of the Old Kingdom.

Copying of selected scenes at Beni Hasan was done by Mr. and Mrs. Davies. F.P.

BULLETIN OF THE METROPOLITAN MUSEUM OF ART, NEW YORK, 1933.

This number contains the preliminary report of the excavations round the pyramid of Se'n-Wosret (Senusert) I at Lisht during the season 1932–33.

Excavations on this site have been carried out intermittently by the Metropolitan Museum for more than a quarter of a century, and it is good to know that the site is still yielding important results. The remains of the pyramid chapel were found together with some of the sculpture with which it had been decorated. The figure of the Nile-god in relief is interesting as an attempt at representing a profile view of the body; the same distortion is seen as in some of the figures of Bedaween at Beni Hasan. The mastaba of Se'n-Wosret-'Ankh proved a valuable discovery, as the burial chamber was very fully decorated in colour. During the excavation of this mastaba and the burial pits within its enclosure several statuettes were found, of which two female figures are the most remarkable. We look forward to the complete publication of this important excavation. M. A. MURRAY.

PALESTINE EXPLORATION FUND. Quarterly. July, 1933.

CROWFOOT, J. W.—*Samaria, Report.*—Small fragments of an Assyrian stele, between 720–650 B.C., are the first such in Palestine. On sinking to the rock sherds of Early Bronze (or Copper) Age were found. Two or three floors of Israelite age have been identified, and four or five levels above the Persian period. The line of the Roman wall leaves the reported tomb of John the Baptist outside the city. The Theatre has been planned. Several tunnels for water supply were traced, one of which implies a great aqueduct across a valley more than 160 feet deep.

PHYTHIAN-ADAMS, W. J.—*Israel in the Arabah.*—Ezion-Gaber is proposed to have been at El Meniyyeh, some way north of Elath, to which the port was transferred by Uzziah. Considerable remains of copper mining and smelting are near El Meniyyeh. The Kenites are claimed as smiths or miners, with Petra as their stronghold.

SUKENIK, E. L.—*Inscribed Hebrew and Aramaic Potsherds.*—These are from Samaria. No 1, "Belonging to Peḳha." No. 2, about shepherds and measures of barley. Two others refer to a year and the produce in the jars. F.P.

Die Bedeutung der altsumerischen Metalltypen für die Chronologie der europäischen Bronzezeit. By Prof. V. G. CHILDE. 6 pp. 1933. (Reprinted from *Mitteilungen der Anthropologischen Gesellschaft in Wien*, vol. LXIII.)

In recent years finds of Sumerian tools, weapons, and jewellery of the plano-convex or pre-Sargonic period have been published which are certainly earlier in date than B.C. 2500. These are compared with contemporary forms from the Indus and from Egypt. The comparison shows how widely the simplest forms of implements had diverged before the middle of the third millenium in these three centres, and consequently how remote in the fourth millenium the origin of the metal industry must have been. Some of these Sumerian types have been found at Troy II and on the Danube (Aunjetitz period). Troy II *may*, therefore, be as early as the first half of the third millenium, whereas on the Danube the Sumerian types are found with a pin with an eyelet in the shank which, though also eastern in origin, is probably of later date, as similar objects were found in a Hittite grave by Woolley (see *Liverpool Annals of Archaeology and Anthropology*, VI, pl. XXIC). L. B. E.

NOTES AND NEWS.

In future ANCIENT EGYPT AND THE EAST will be published half-yearly on June 1 and December 1 instead of in quarterly parts as hitherto. The annual subscription rate will remain the same.

The excavation of Tell Ajjul is proceeding apace and interesting results are promised for the next number of this Journal.

The outstanding item of recent archaeological news is the purchase by the nation of the Codex Sinaiticus, not only for the great interest of the manuscript, but also for the fact that it marks a revival of that world-wide interest in archaeology which was so marked when the tomb of Tut-ankh-amen was brought to light. After the War archaeology was forgotten until Howard Carter's great discovery; during the late financial depression it again fell into the background, but the acquisition of the Sinaitic Codex has re-awakened the general public to the value of the records of the Past. That a document of such importance should be costly is only to be expected; but the possession by the British nation of two out of the three earliest MSS. of the Bible—the Codex Alexandrinus and now the Codex Sinaiticus—makes the British Museum the richest library in the world for Biblical scholars. The cost of the Codex Sinaiticus is £100,000, of which half must be raised by private subscriptions. The British Museum has issued an Appeal for funds; such an object should surely commend itself to all readers of this Journal. Subscriptions can be sent to

THE DIRECTOR,
British Museum,
London, W.C. 1,

or to the Westminster Bank, Ltd., Bloomsbury Branch, 214, High Holborn, London, W.C. 1. Cheques may be made payable to the Trustees of the British Museum and crossed "Sinai Bible Manuscript Account."

It is to be hoped that ere long this new interest in archaeology will lead to the resumption of those archaeological explorations which have been suspended or curtailed for lack of the necessary funds. There are fresh fields to be explored in Baluchistan and India; their great importance for the further understanding of the cultures of other lands is evident from the recent work in the Indus Valley and the finds of Sir Aurel Stein in Northern and Southern Baluchistan.

It has been announced that the British School of Archaeology in 'Iraq has this season allotted the sum of £500 to Sir Aurel Stein for the furtherance of archaeological exploration in Southern Persia.

There is welcome news from 'Iraq. Fears were recently entertained that the generous facilities accorded to archaeological research by the present

Antiquities Law were about to be withdrawn by the Government ; fortunately these have not materialised. Dr. and Mrs. C. L. Woolley have accordingly once more resumed the excavation of Ur, where a cemetery of Jemdet Nasr date is to be cleared.

The present unavoidable curtailment of facilities for archaeological study at the British Museum owing to necessary repairs and reconstruction is one of those trials that must be met with patience. The sympathy of all who are aware of their present difficulties will be extended to the staff of the Department of Assyrian and Egyptian Antiquities.

OBITUARY.

The death of Miss Winifred Crompton, Curator of the Egyptian department in the Manchester Museum, will be mourned by a wide circle of friends far beyond the immediate confines of her own department and of the Manchester Egyptian and Oriental Society, whose growth and development have been so closely bound up with her during the twenty-two years since its foundation. To her charming and friendly personality, as well as to her knowledge and enthusiasm, the advancement of Egyptological studies in the University of Manchester is largely due.

It is of interest to note that the Manchester Museum, in which Miss Crompton took so great a pride, was founded partly by the munificence of the late Mr. Jesse Haworth, who was also closely associated with the early work of Sir Flinders Petrie.

The premature death of Mr. Arthur Weigall has brought to an early close a life of keen and enthusiastic activity in the field of archaeology. In his earlier days as *Inspecteur-général* in the Egyptian Antiquities' Service, he initiated the sound policy of protecting with iron doors those Theban tombs whose paintings have preserved for us the priceless scenes of daily life in ancient Egypt. His Topographical Catalogue of those tombs and his *Guide to the Antiquities of Upper Egypt* are most valuable pieces of work. Throughout his career he has produced pen-pictures of archaeological subjects which always rouse intense interest in the minds of the general public.